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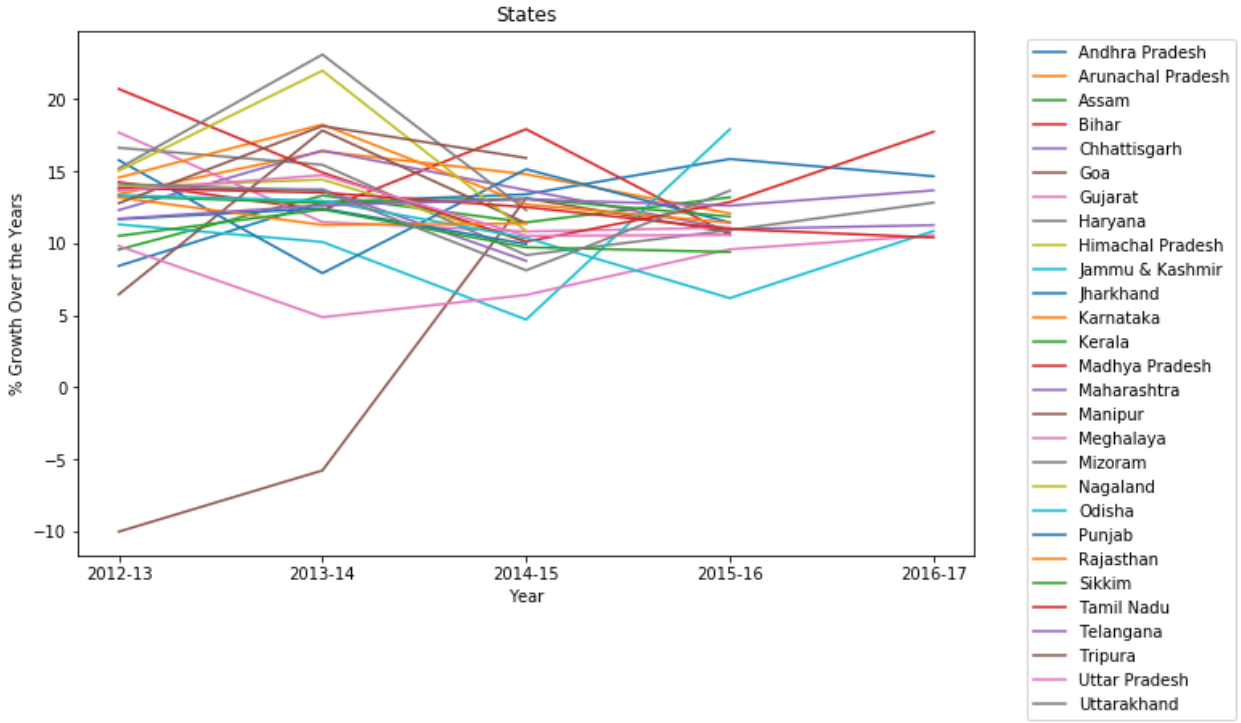
PROBLEM STATEMENT

India ranks 11th in the world in terms of total GDP; however, it lies at the 139th position in terms of per capita GDP. The objective of this analysis is to identify why there is such a big disparity between the two key indexes and to guide the CMs of the states in-order to bolster their economic development.

Part-I: GDP Analysis of the Indian States

- GSDP data for all the 28 states except for West Bengal; for years from 2012-13 to 2016-17 were used for the following analysis. So unfortunately, this study won't be helping the state of West Bengal.

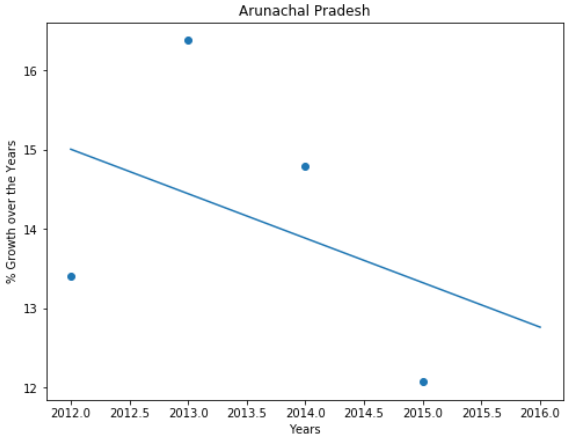


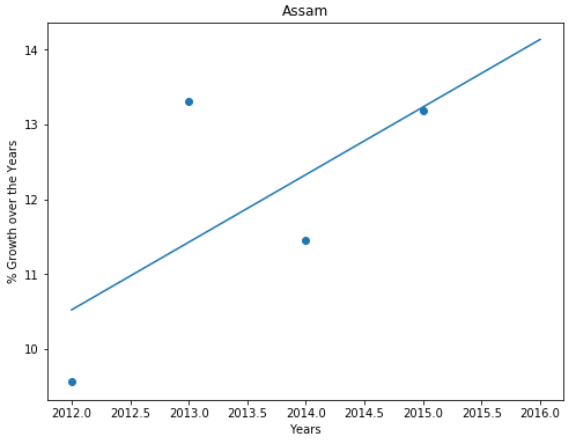
These are the trend lines which each of the states followed during the said time-period. I'm sure this graph won't be making any sense to anyone, so I'll be giving proper explanation about the same below.

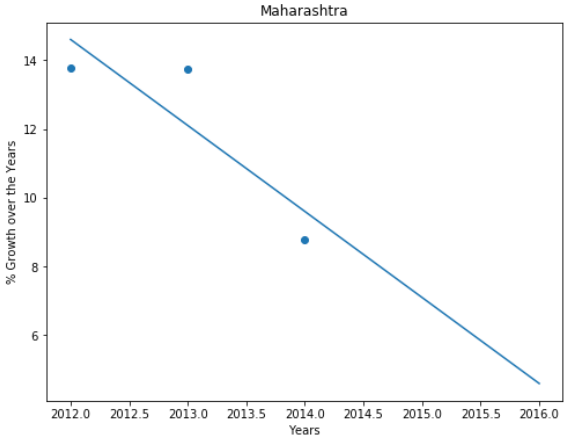
In-order to properly analyze the data during the time period, scatter plots and linear regression techniques were used to identify the trend followed by each state.

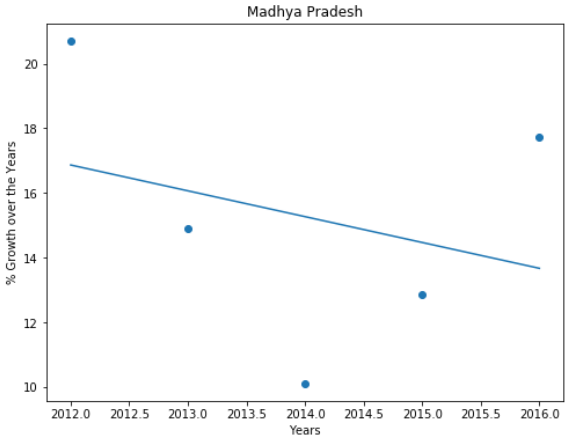
India is having an overall dip in economic growth in the period of study. This could be a cause for concern.

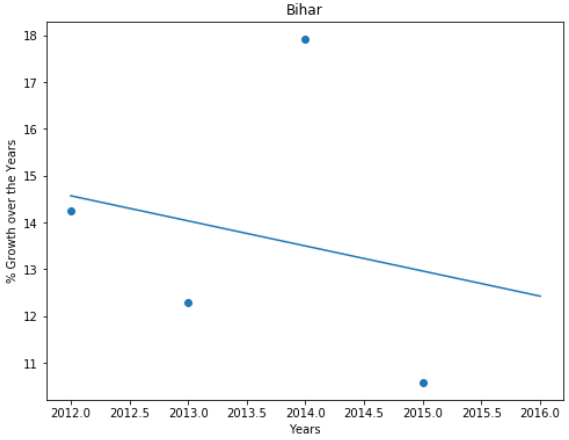
By looking at the slope of the best fit line we can clearly classify which states are growing consistently and which states are not. Identifying what is going good for the developing states and what is going wrong for the declining states might help us serve them both positively.

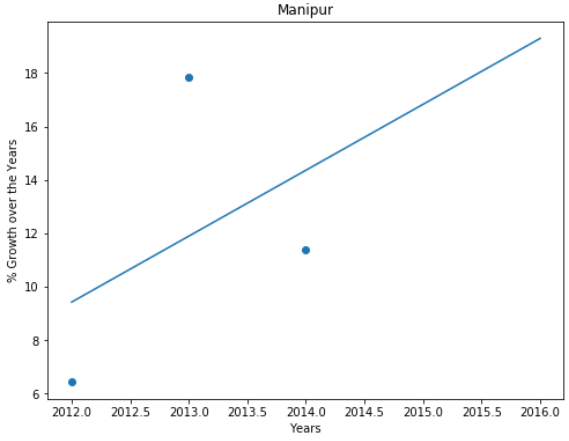

Arunachal Pradesh
% Growth over the Years
Years

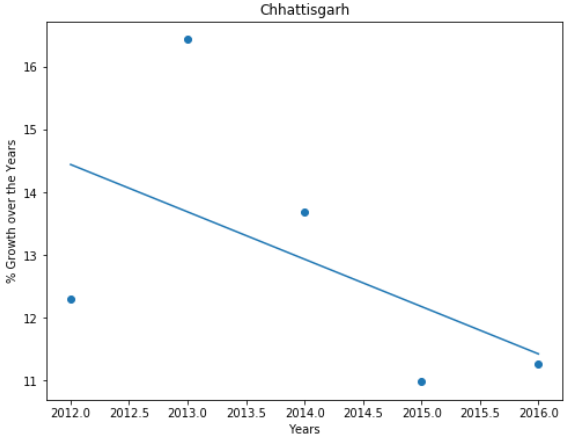

Assam
% Growth over the Years
Years

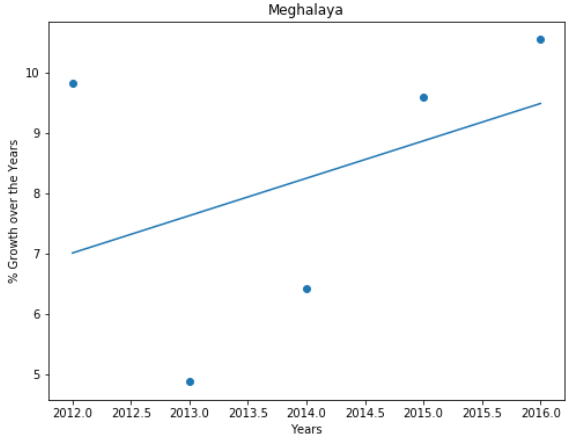

Maharashtra
% Growth over the Years
Years

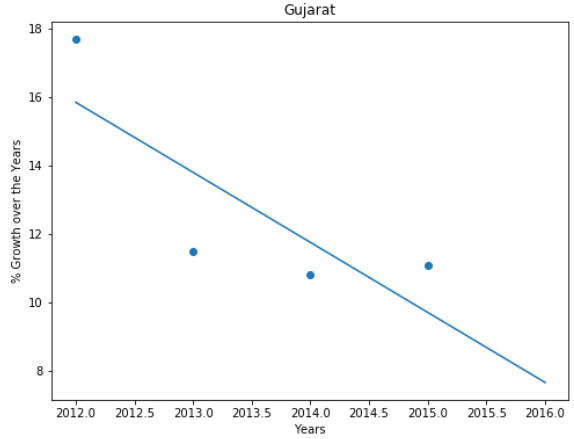

Madhya Pradesh
% Growth over the Years
Years

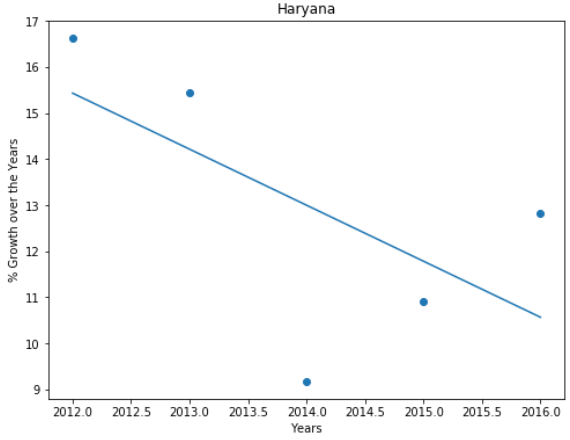

Bihar
% Growth over the Years
Years

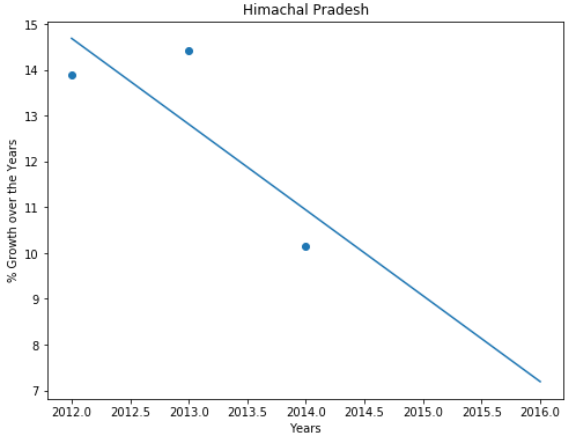

Manipur
% Growth over the Years
Years

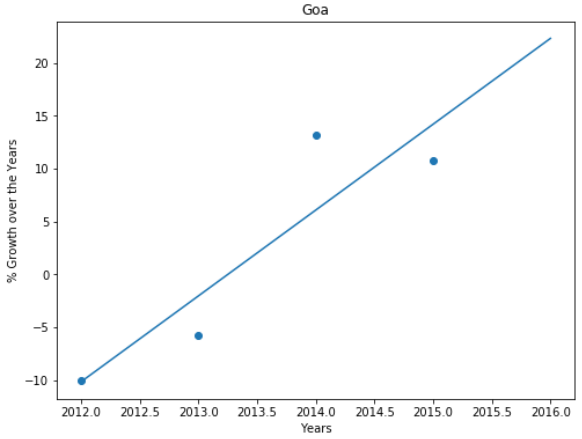

Chhattisgarh
% Growth over the Years
Years

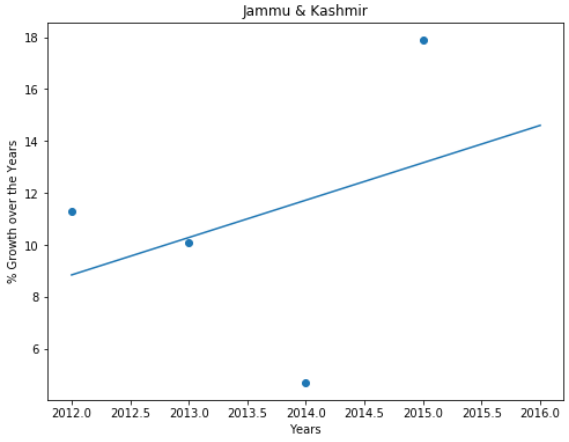

Meghalaya
% Growth over the Years
Years

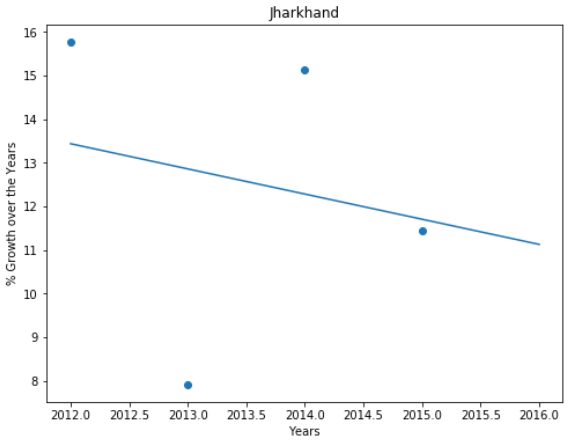

Gujarat
% Growth over the Years
Years

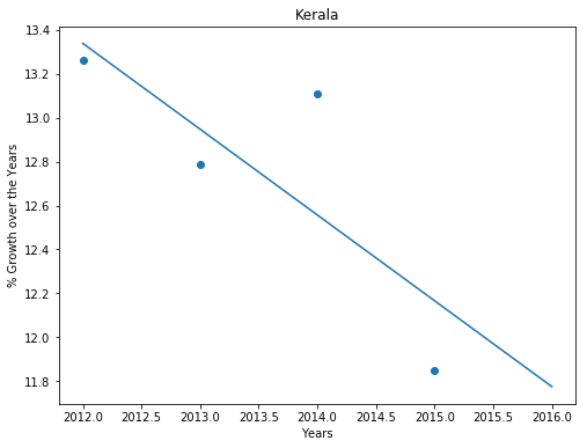

Haryana
% Growth over the Years
Years

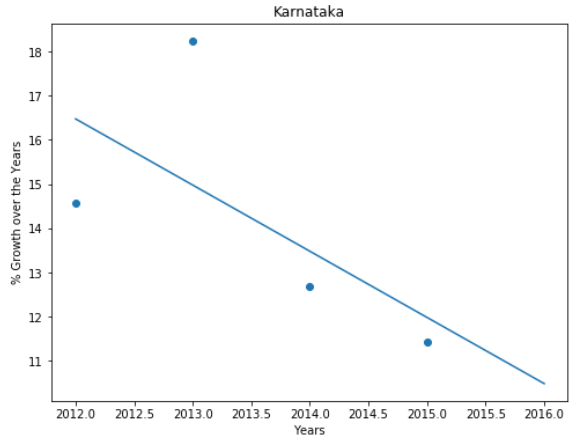

Himachal Pradesh
% Growth over the Years
Years

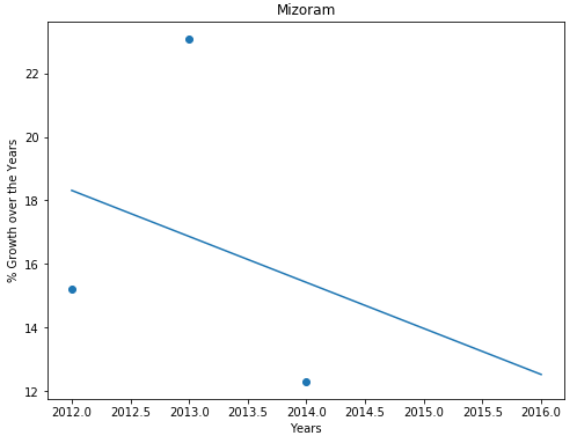

Goa
% Growth over the Years
Years

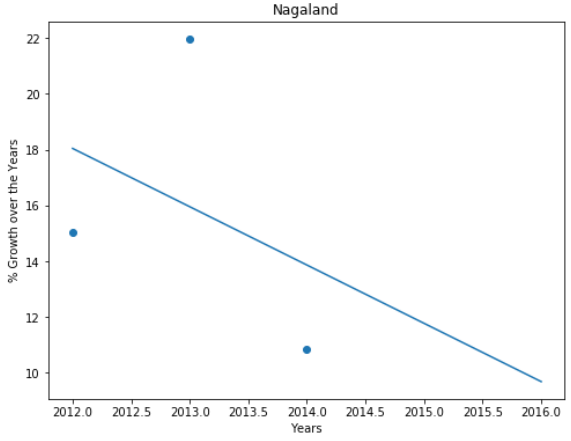

Jammu & Kashmir
% Growth over the Years
Years

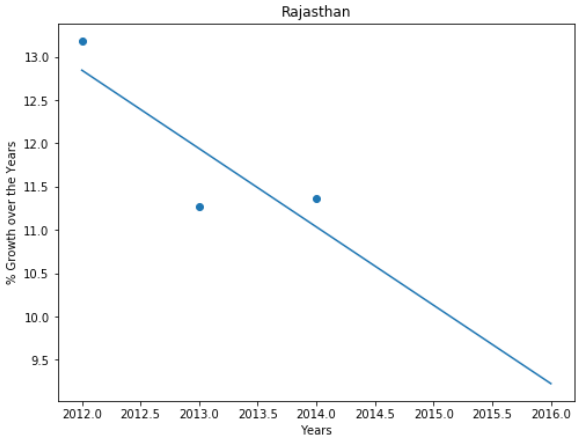

Jharkhand
% Growth over the Years
Years

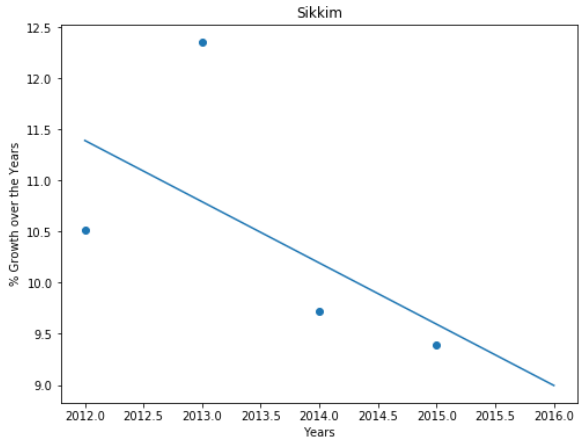

Kerala
% Growth over the Years
Years

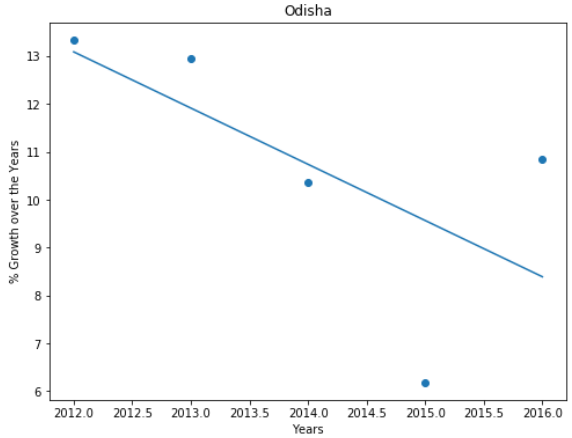

Karnataka
% Growth over the Years
Years

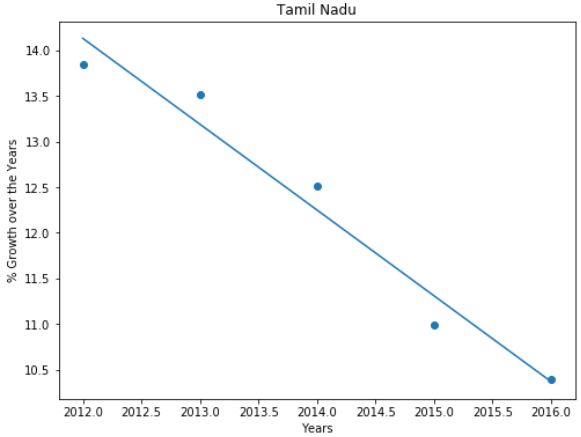

Mizoram
% Growth over the Years
Years

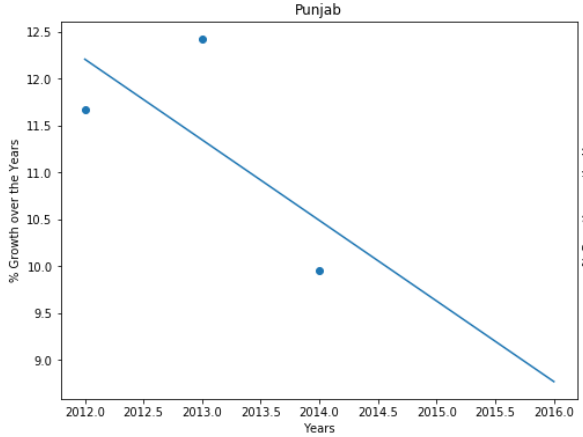

Nagaland
% Growth over the Years
Years

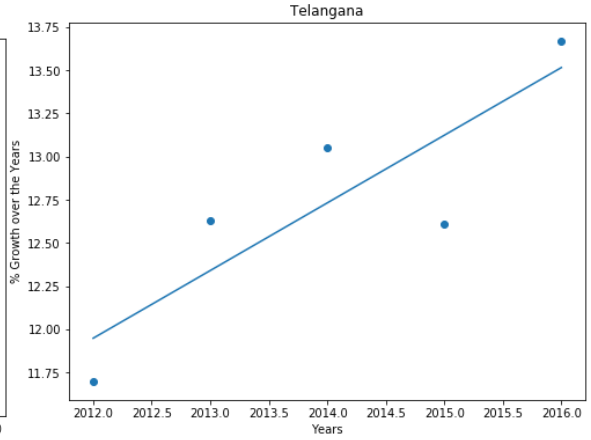

Rajasthan
% Growth over the Years
Years

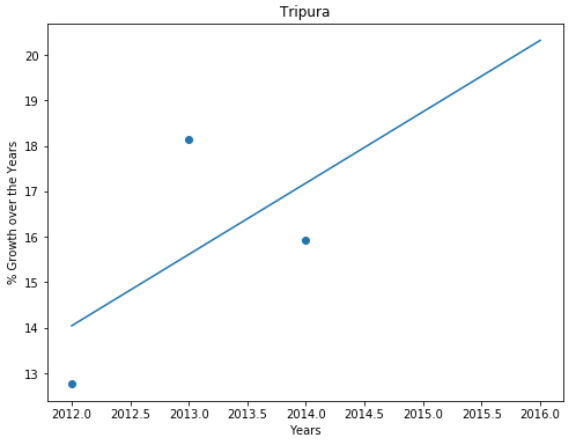

Sikkim
% Growth over the Years
Years


Odisha
% Growth over the Years
Years

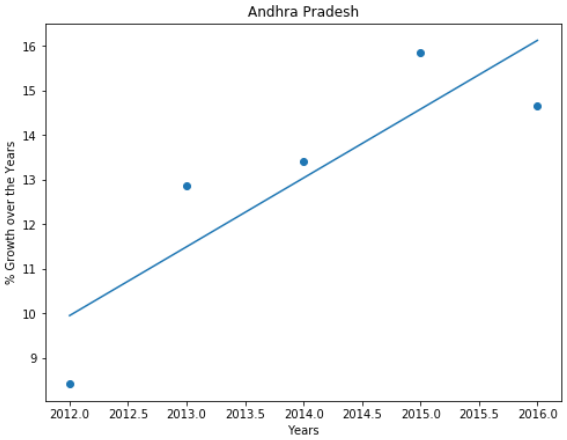

Tamil Nadu
% Growth over the Years
Years


Punjab
% Growth over the Years
Years


Telangana
% Growth over the Years
Years

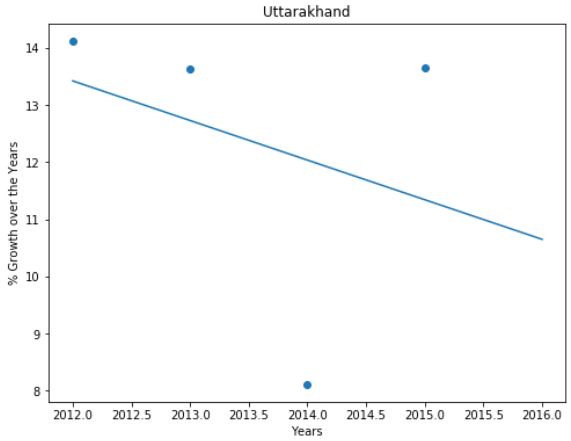


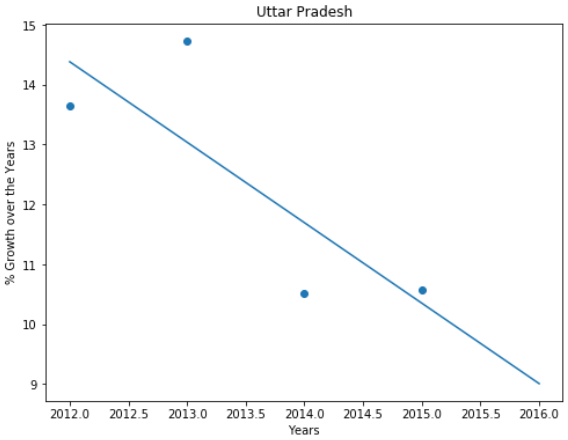
States	GrowthRate
Goa	8.120
Manipur	2.470
Tripura	1.570
Andhra Pradesh	1.544
Jammu & Kashmir	1.441
Assam	0.903
Meghalaya	0.619
Telangana	0.392
Kerala	-0.391
Bihar	-0.536
Arunachal Pradesh	-0.561
Jharkhand	-0.577
Sikkim	-0.599
Uttarakhand	-0.693
Chhattisgarh	-0.754
Madhya Pradesh	-0.799
Punjab	-0.860
Rajasthan	-0.905
Tamil Nadu	-0.940
Odisha	-1.174
Haryana	-1.216
Uttar Pradesh	-1.343
Mizoram	-1.450
Karnataka	-1.496
Himachal Pradesh	-1.875
Gujarat	-2.045
Nagaland	-2.090
Maharashtra	-2.505



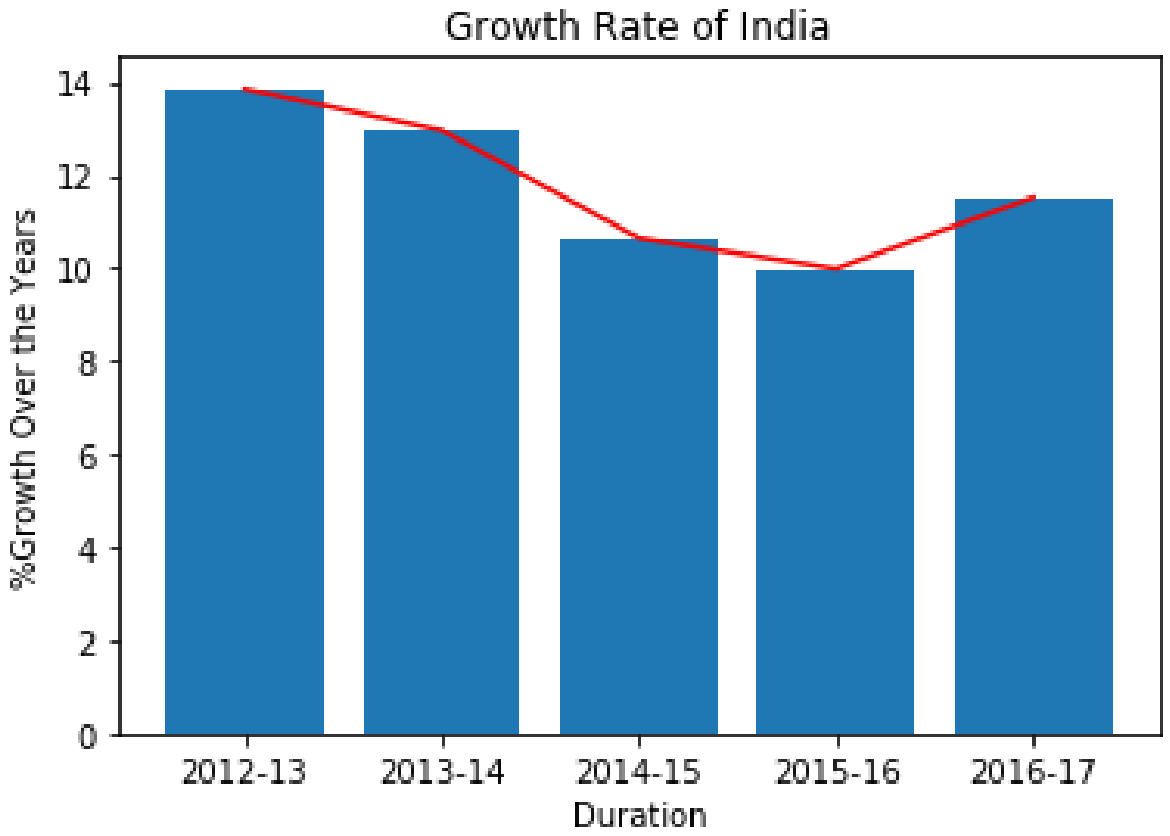
Growth Rate is found out by calculating the slope of the regression lines for each state.

y=mx+c where m is the slope and c is y-coordinate.

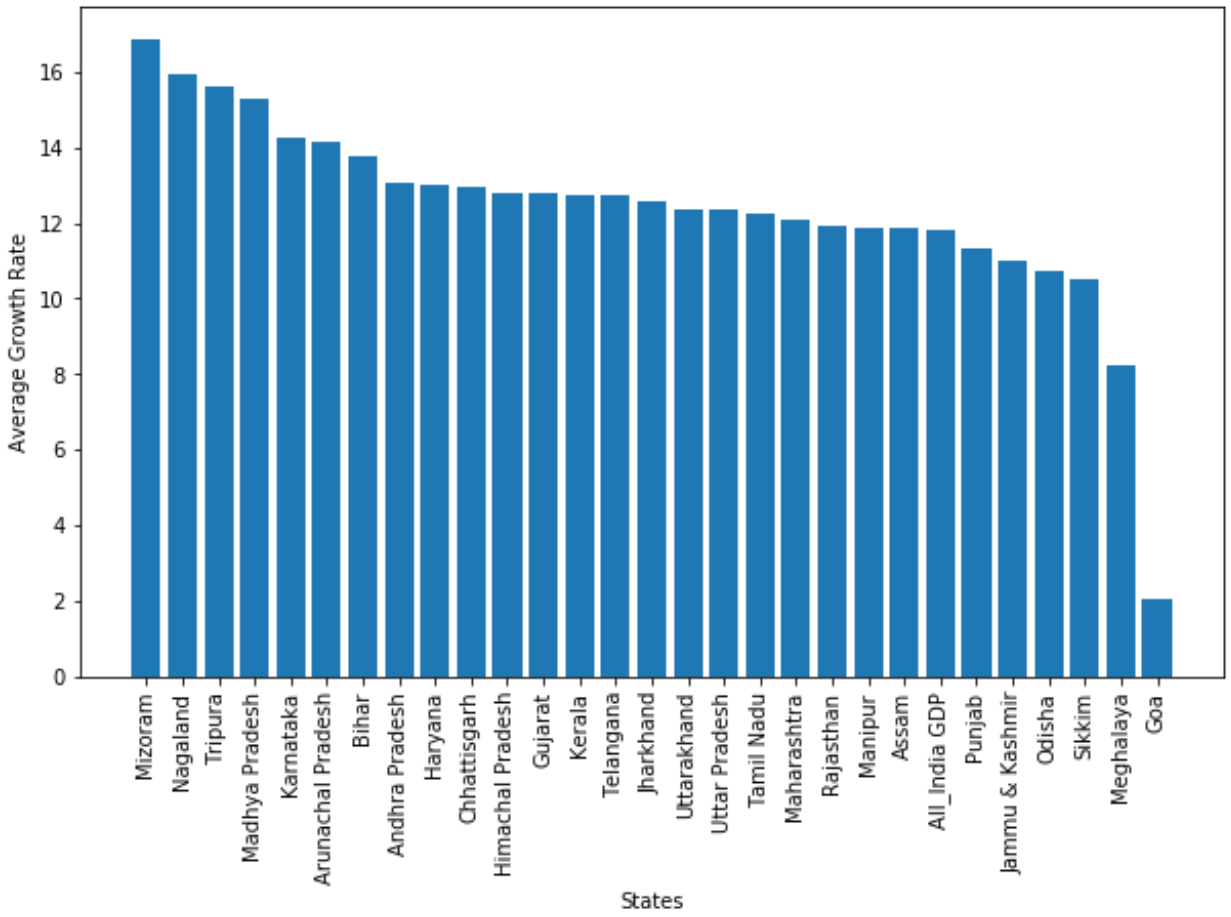




- By analyzing the slope of the above graph's we can identify which are the 3 fastest and the 3 slowest-growing economy in the country.
- *Fastest States are:*
  - *Goa*
  - *Manipur*
  - *Tripura*
- *Slowest States are :*
  - *Maharashtra*
  - *Nagaland*
  - *Gujarat*

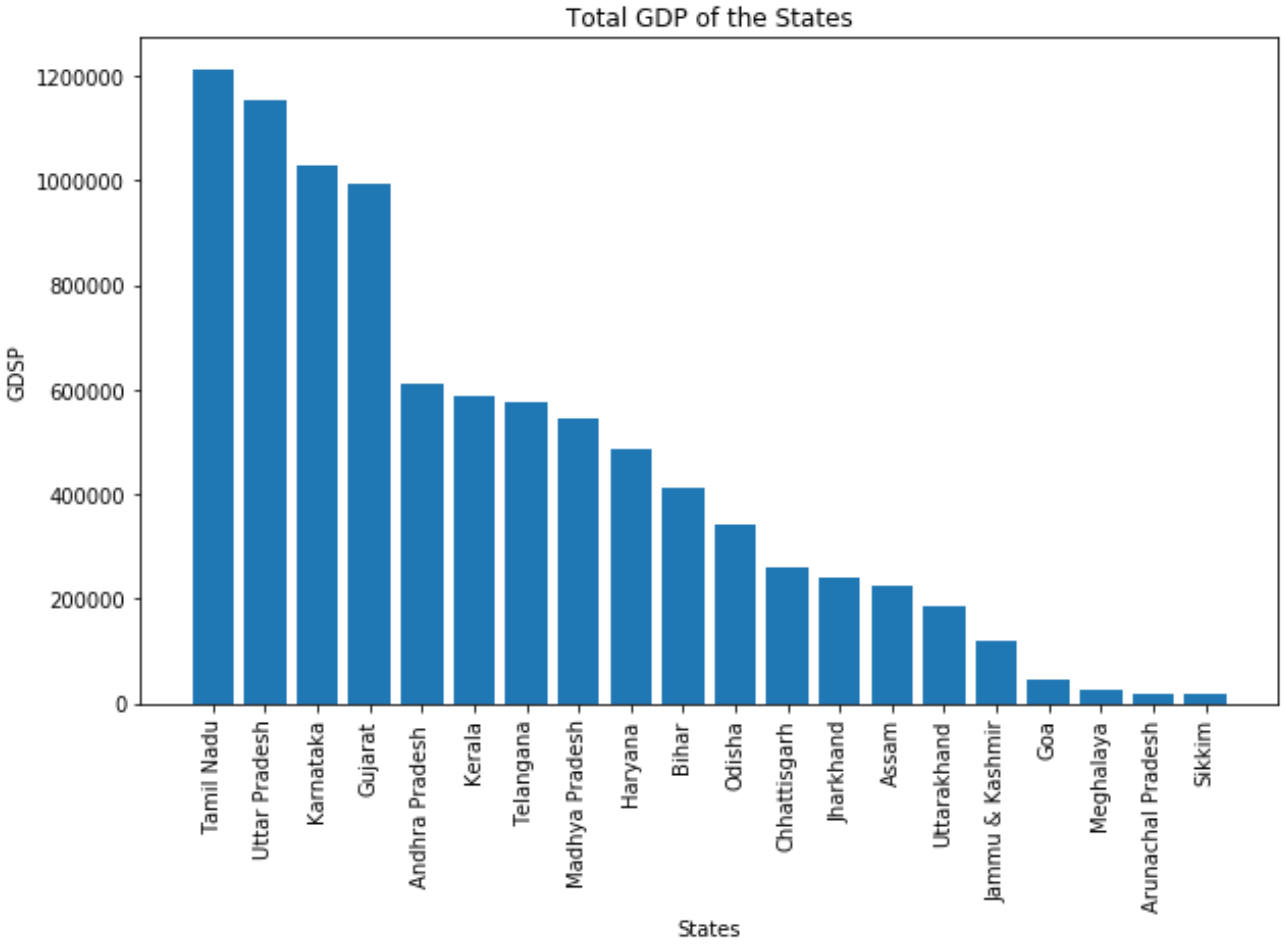


Though one can use the slope to compare which states have been consistently growing or not, it is not a suitable method to compare the growth rate of 2 states. This can be done by finding the average growth rate for each state over the given time period.



We have a problem here; Goa despite being the fastest growing state, is showing the least average growth.
This is because its initial growth rate was very low.

Note:-
National Growth Rate Average is 11.8%.
Growth Rate Average of my home state(Kerala) is 12.75%.
So you can say Kerala is performing better than many other states in India.



Comparison of Total GSDP for the year 2015-16

Top 5 States based on GDP are:
1.Tamil Nadu
2.Uttar Pradesh
3.Karnataka
4.Gujarat
5.Andhra Pradesh

Bottom 5 States based on GDP are:
1.Sikkim
2.Arunachal Pradesh
3.Meghalaya
4.Goa
5.Jammu & Kashmir

Once again I am taking GOA as my test case , now we know that the average growth rate of Goa was less in comparison to the national growth rate but it was the fastest growing state; but here, it's total GDP is very less. However, ***Goa is a well established tourist destination and its economy shouldn't be this bad.*** *GDP could be less because the population in Goa is less and* ***population-GDP*** *is directly correlated. We will get an accurate insight about this once the analysis of GDP per capita is done.*

Part-I B

GDP can be broadly divided into goods and services produced by three sectors: the primary sector (agriculture), the secondary sector (industry), and the tertiary sector (services).

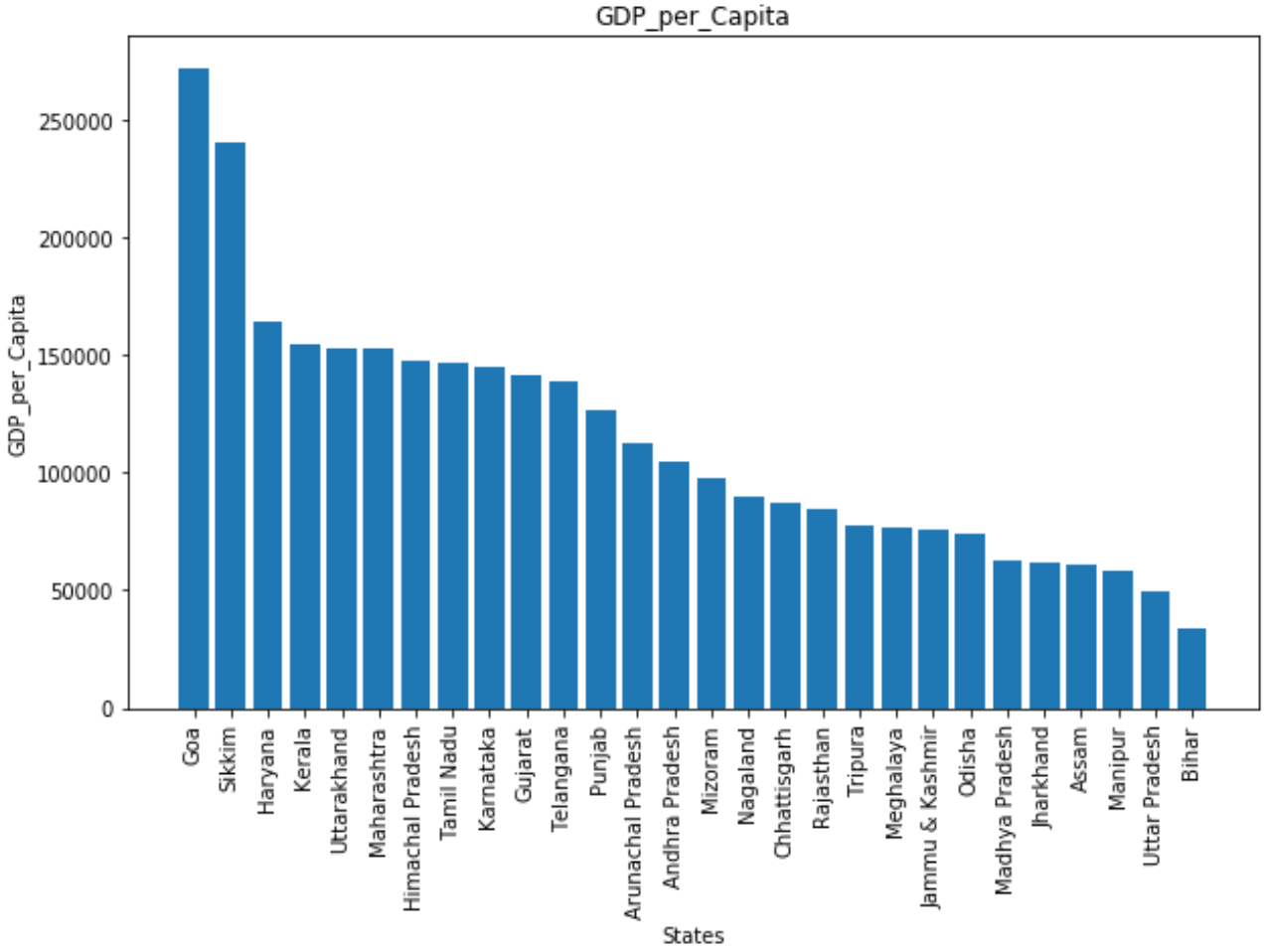
So this part of the analysis will be mainly dealing with the above sectors and GDP_per_capita for each states.

Region	GDP_per_Capita
Goa	271793.0
Sikkim	240274.0
Haryana	164077.0
Kerala	154778.0
Uttarakhand	153076.0

Goa is having the highest GDP_per_Capita, despite having one of the lowest total GDP. Thus proving my earlier hypothesis that GDP is directly correlated to population.

Then another question arise; so if population is the sole criteria , then why are other low populous states not having better economy ?

This is because GDP_per_Capita is not only dependent on population but also the disparity between the rich and poor among its citizens. If a small state has a good GDP_per_Capita, then that means its disparity will be less.
GDP per capita is the measure of a country's economic output that accounts for its number of people. It divides the country's gross domestic product by its total population. That makes it a good measurement of a country's standard of living. It tells you how prosperous a country feels to each of its citizens.



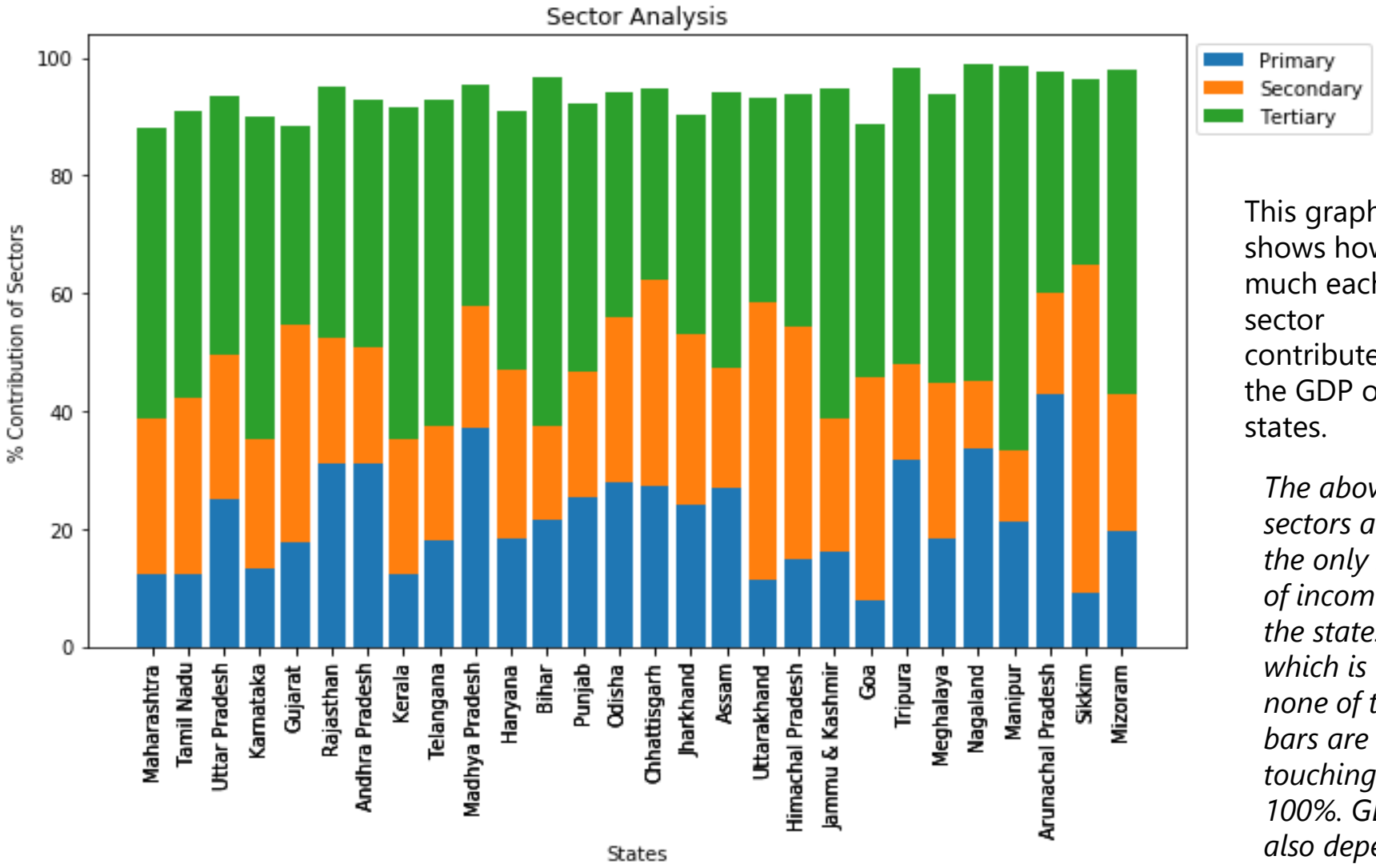
Top 5 States are:

1.Goa
2.Sikkim
3.Haryana
4.Kerala
5.Uttarakhand

Bottom 5 States are:

1.Bihar
2.Uttar Pradesh
3.Manipur
4.Assam
5.Jharkhand

*The ratio of highest to lowest GDP per capita of the country is **8.005**. This indicates by how much our economic prosperity differs from state to state.*



This graph shows how much each sector contributes to the GDP of the states.

The above 3 sectors are not the only source of income for the states, which is why none of the bars are touching 100%. GDP is also dependent on the tax levied and subsidies offered by the state.

One Inference I can derive from this graph is that educated states like Kerala and Tamil Nadu are less dependent on revenue from primary sectors but more on tertiary and secondary sectors which requires workers with basic levels of education.

For our next analysis, we will be categorizing each states in Categories C1-C4 based on its per capita GDP.

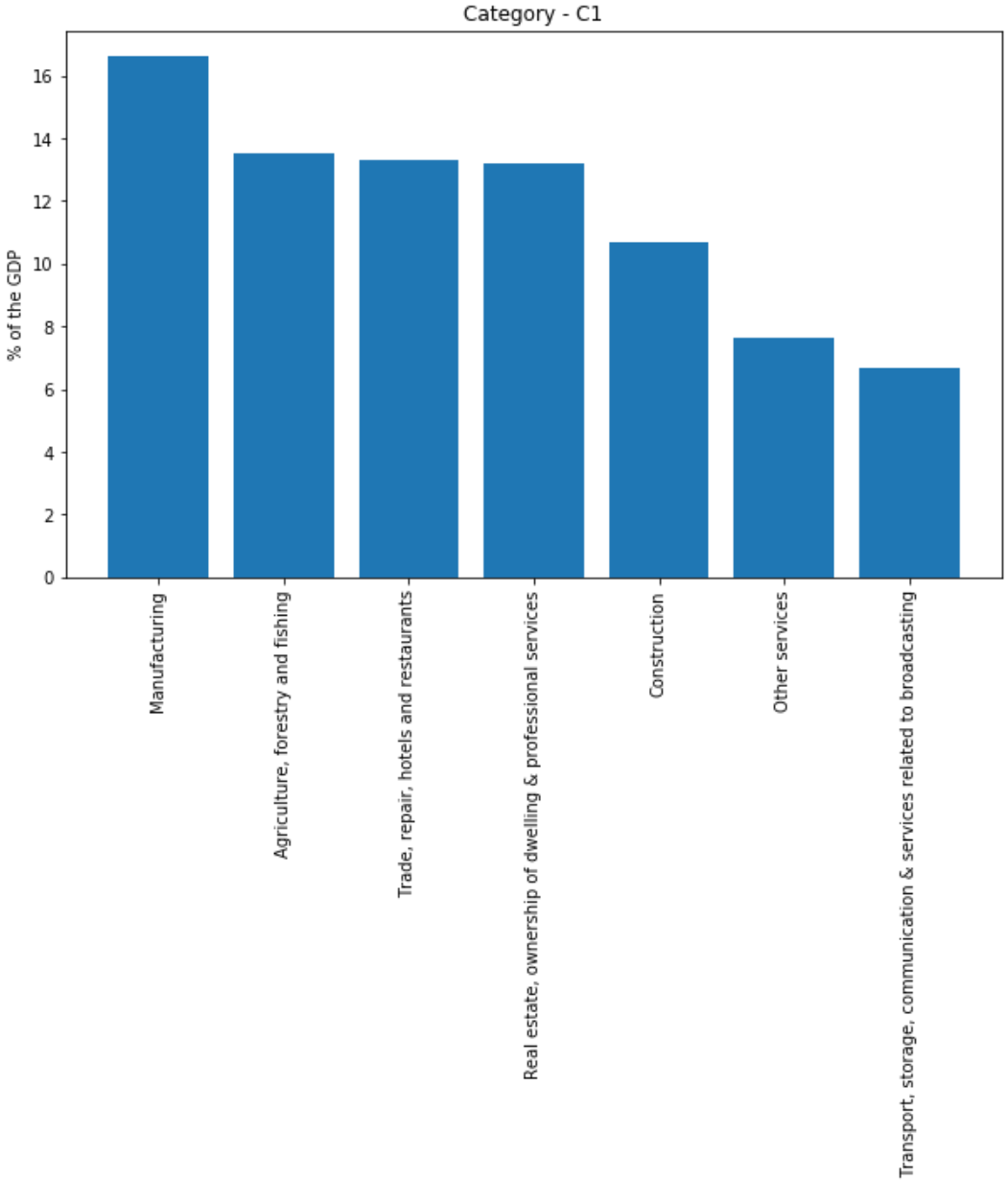
0-25 percentile will be C4
25-50 percentile will be C3
50-80 percentile are C2
80-100 percentile are C1.

***There are fewer states in C1 when compared to the other categories because of which its Total GDP appears lesser.*

Hypothesis:-

States in C1 will be the best places in the country then followed by C2. In these 2 Categories, the GDP will be mostly contributed by Secondary and Tertiary Sectors.

States in C3 and C4 are economically backward and their primary source of revenue would be Primary sector. People from these states lack basic educational qualifications.

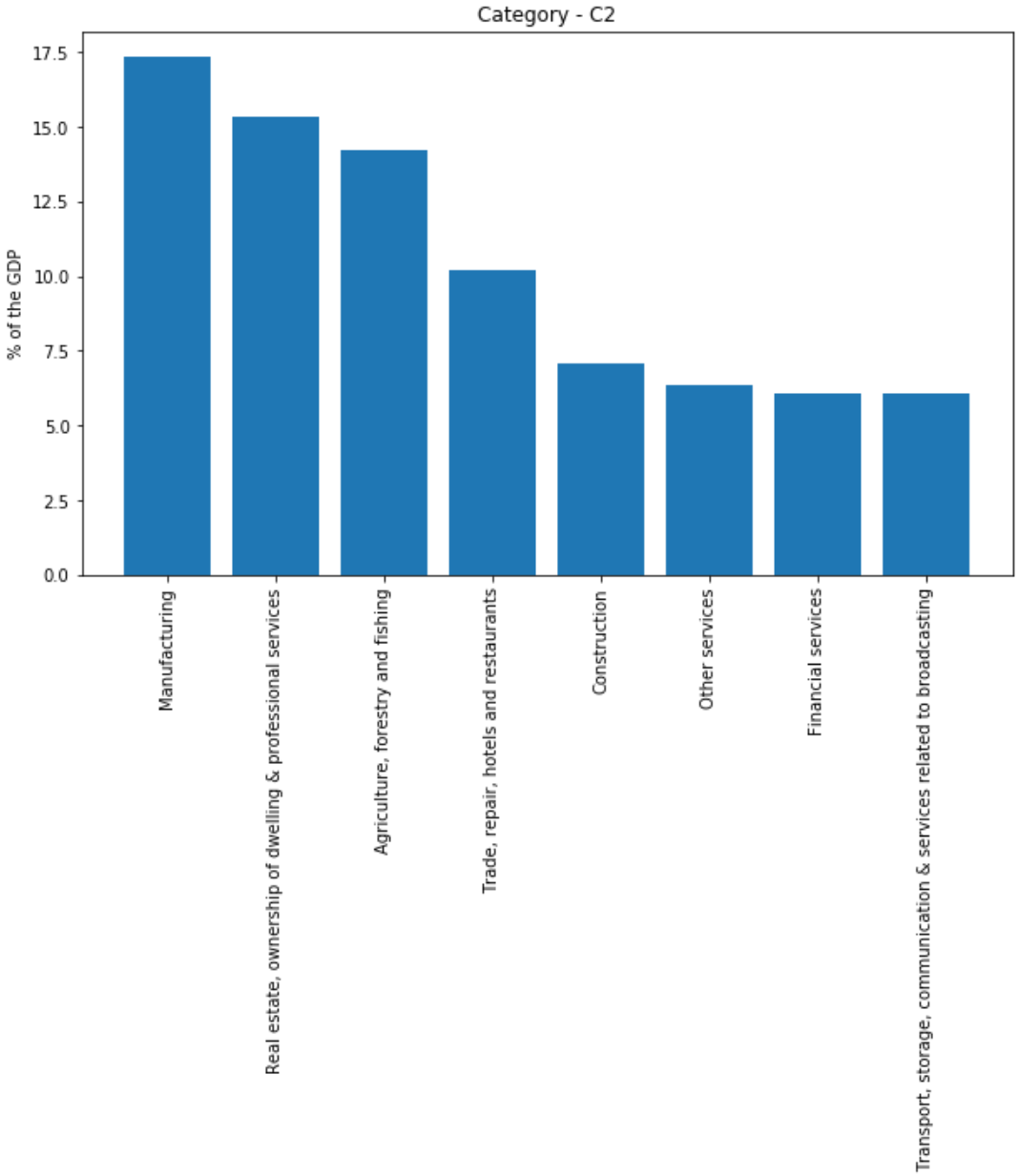


These 7 sub-sectors contribute to about 80% of C1 category's total GDP.

States in this category have the best performing economy in the country. Primary source of their revenue is Manufacturing sub-sector, which is part of secondary sector. All the other sub-sectors in the graph except Agriculture, are from either secondary or tertiary sector.
Thus proving point one of the hypothesis that they mostly rely on Secondary and tertiary sectors rather than primary sectors.

Some ideas to improve productivity in this Category are:

- *Ensure continued education of the youth.*
- *Create entrepreneurship development cells and awareness camps.*
- *Improve financial services.*
- *Improve existing services and facilities*
- *Create new avenues to improve public spending.*

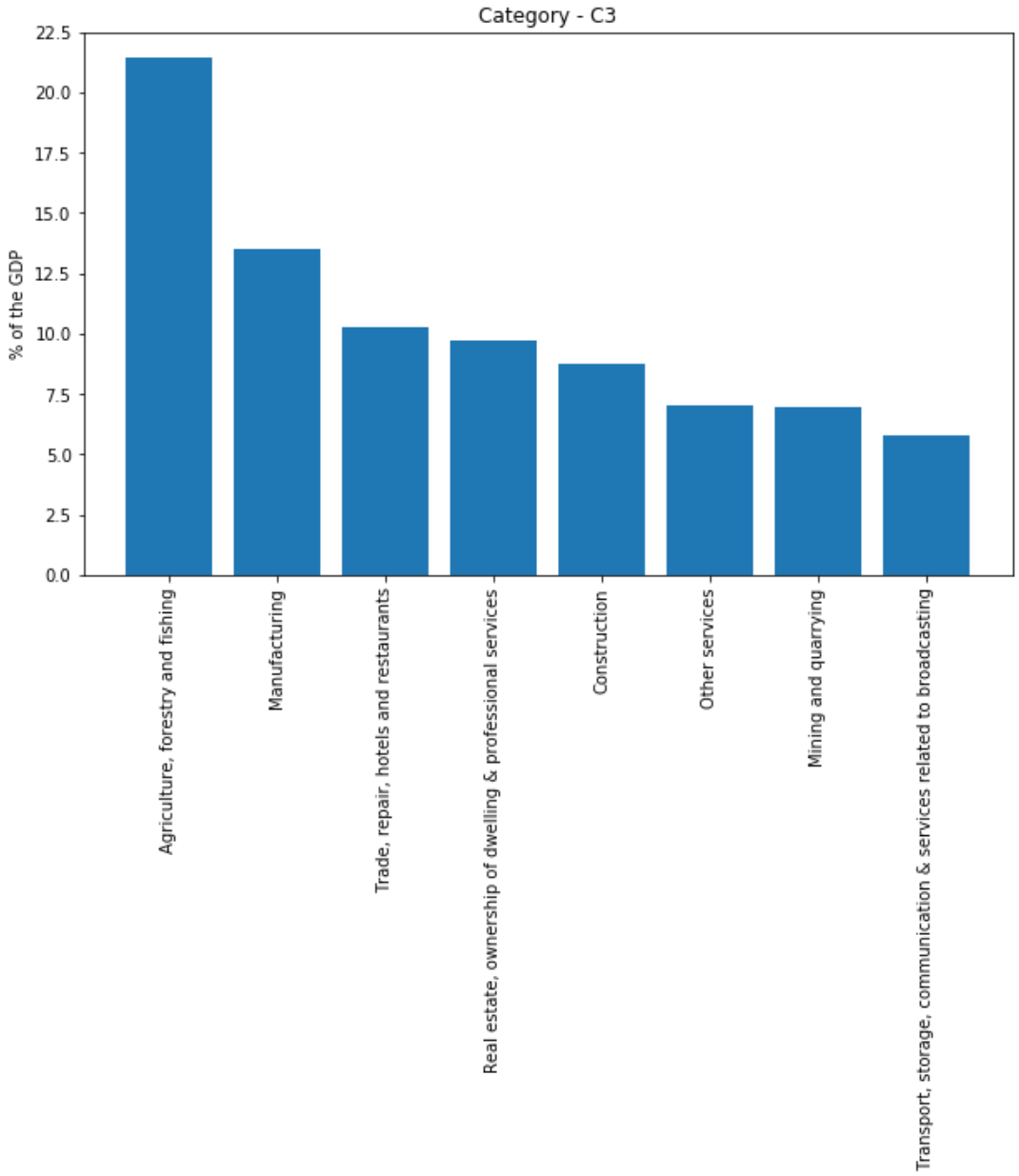


These 8 sub-sectors contribute to about 80% of C2 category's total GDP.

States in this category are the next best economy in the country. Apart from Agriculture, rest of the sub-categories are from secondary and tertiary sectors just as hypothesized.

Some ideas to improve productivity in this Category are:

- *Introduce state of the start research and educational facilities.*
- *Improve financial services.*
- *Improve existing services and facilities*
- *Create new avenues to improve public spending.*
- *Get new investors and bolster business economy.*

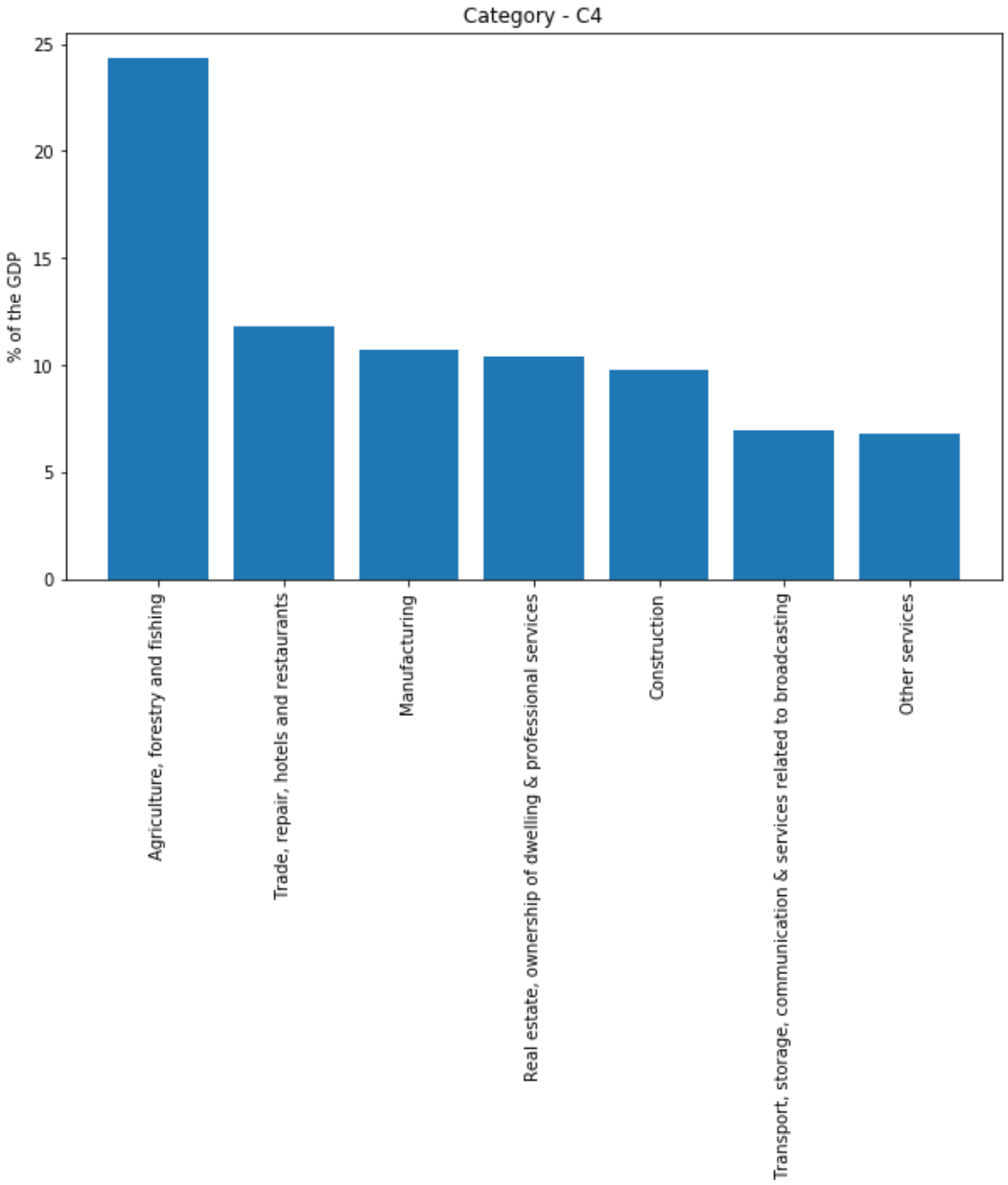


These 8 sub-sectors contribute to about 80% of C3 category's total GDP.

States in C3 and C4 category are having poor economic standards. They rely heavily on primary sectors for income as evident from the graph. Both agriculture and Mining is a major contributor to its GDP.

Some ideas to improve productivity in this Category are:

- *Create awareness about continued education.*
- *Improve existing services and facilities*
- *Establish good schools and teaching facilities.*
- *Improve manufacturing sector to create more skilled jobs.*



These 7 sub-sectors contribute to about 80% of C4 category's total GDP.

States in this category are the most economically backward. Their major source of revenue is Agriculture.

Some ideas to improve productivity in this Category are:

- *Ensuring that youth complete their basic education.*
- *Improve manufacturing sector to create skilled jobs.*
- *Create public awareness about jobs and education.*
- *Introduce better facilities and services to improve standards of living.*

Part-II

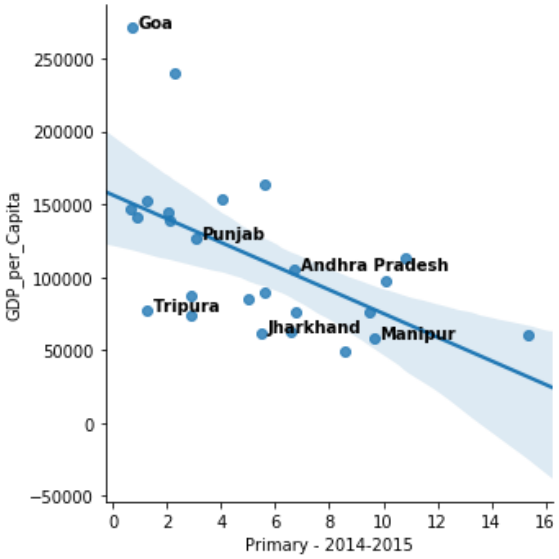
This part of the analysis is to figure out how the dropout rates of students affect the GDP of the states.

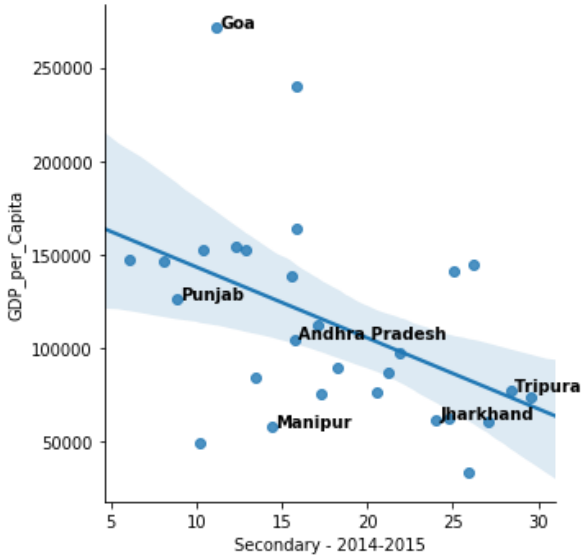
Hypothesis:-

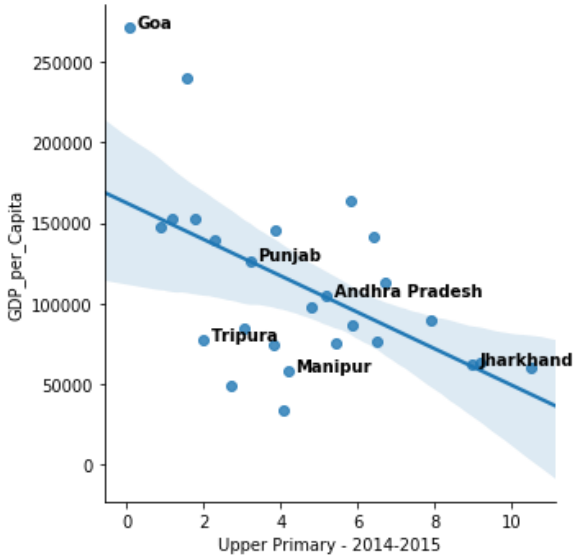
If dropout rate of the states are more, then GDP of the state will lesser.

If dropout rate of a state increases, then its reliability on primary sector will increase.

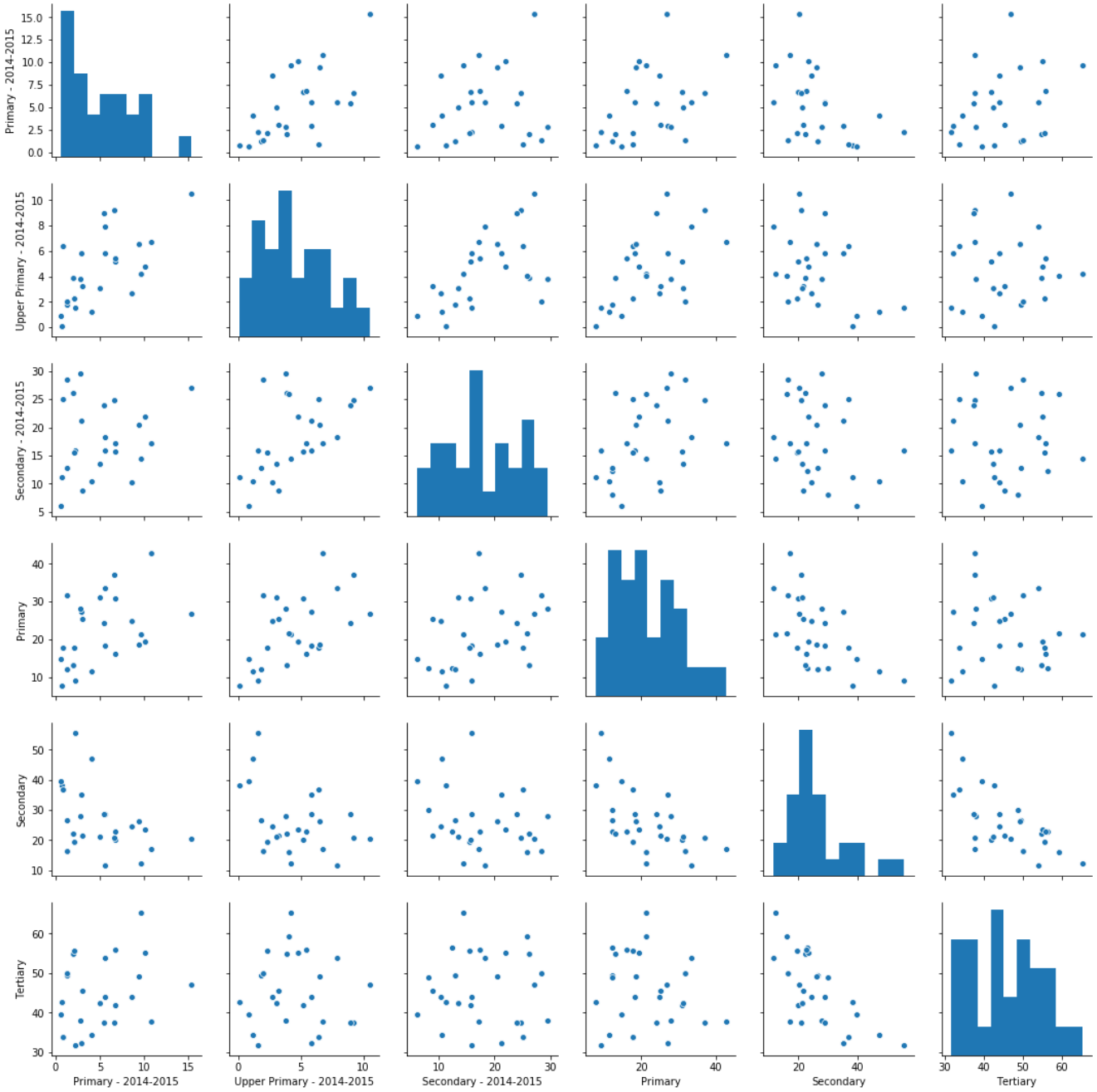
Dropout rates are independent of the population of the state.



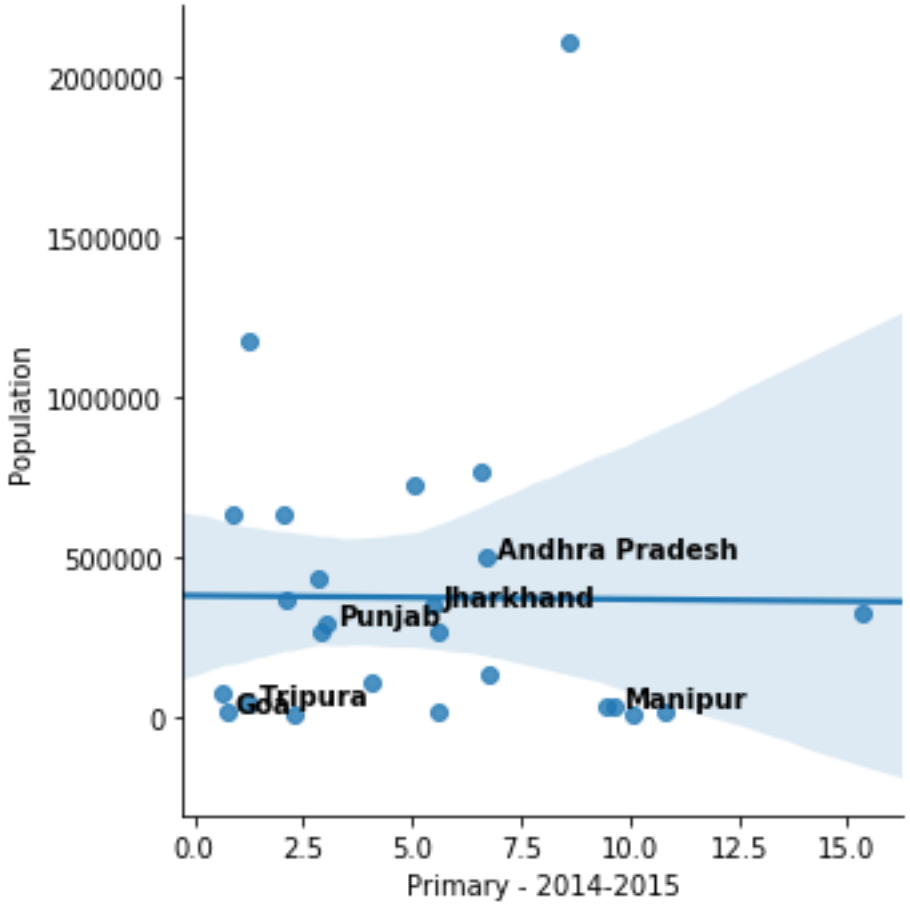




The student drop out rate is negatively correlated with the GDP_per_Capita of the states. That is, as the student drop out rates increases, the GDP_per_Capita of the State will decrease. Thus we can emphasize the importance of education and its impact on our economy.
Hence proving point one of the hypothesis.



From the pair-plot it is clear that as dropout rates increases, primary sector contribution will increase, also, secondary and tertiary sector contribution will decrease. i.e., ***Dropout rate and Primary sector is positively correlated. Dropout rate and the other two sectors are negatively correlated.*** *This proves the initial hypothesis and also shows why C4 and C3 category states are mainly focused on primary sector jobs.*



	Population	Secondary - 2014-2015
Population	1.00000	-0.05625
Secondary - 2014-2015	-0.05625	1.00000

	Population	Upper Primary - 2014-2015
Population	1.000000	-0.056981
Upper Primary - 2014-2015	-0.056981	1.000000

	Population	Primary - 2014-2015
Population	1.000000	-0.009443
Primary - 2014-2015	-0.009443	1.000000

Dropout rates of the states are independent of the population of the state. i.e., there is no correlation between the two; just as proposed in the hypothesis.