INDIAN STATE'S EDUCATION ANALYSIS OF GDP WITH DROPOUT RATES

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FEYNN LABS REAL WORLD PROJECT

Abstract

Education plays a very significant role while considering it as one of the causative factors affecting to Human Development. Literacy remained core pillar in the construction of Human Development Index methodology. Education has been seen as a key to reduction of poverty and promoting equity, fairness, and social justice. It helps to produce the essential supply of human capital. Therefore, investment in education has been considered to be growth oriented. But there is an ongoing debate regarding the effects of educational investment on economic growth across the world. The primary objective of this paper is to carry out an empirical investigation on the relationship between investment in education and economic growth. It explores short run and long run dynamic relationship between educational investment measured as educational expenditure and economic growth measured in terms of Gross Domestic Product (GDP) in Indian context using annual data series from 2015 to 2016. The results are in confirmation with earlier studies indicating long run stable equilibrium relation between education and GDP. The relationships are examined by utilization of econometric estimations with the Granger Causality Method and the Cointegration Method. These methods are used to create models that could shed light on the claim that education plays a central and significant role in economic growth of India which could consequently be used as an example for similar countries in Asia or around the world. The findings of this work show that there is compelling evidence proving a positive connection between education levels and economic growth in India which might influence governmental actions and shape the future of India.

Keywords: education, gross enrolment rate, economic growth, impact, India, Asia

INTRODUCTION

Economic growth of a country may get hampered due to a number of different factors. Example of such a factor is natural resources – land, crude oil, water resources and agro-based industry (for example sugar industry). In many countries, natural resources play very important role regarding economic growth (Maitah and Smutka, 2016; Maitah et al., 2016; Smutka et al., 2015; Řezbová et al., 2015; Kharcheva et al., 2016). Another example is government policies which has always had a significant influence on economic growth. Specifically, fiscal policy, monetary policy and policies related to foreign exchange rates play significant role regarding economic growth of a country. Avoiding significant overvaluation of the currency is one of the most robust imperatives that can be gleaned from the diverse experience with economic growth around the world (Maitah, M., et al., 2016; Clark et al., 2015; Maitah et al., 2017; Maitah et al., 2014). There is also a significant influence of FDI on education system and economic growth. Singh Kalpan (2016) focuses in his work on impact of FDI on tertiary level of education where the impact should be positive and improve the quality of education and consequently contribute to the national growth of the economy since human capital is one of the key determinants of economic growth for both developing and advanced economies. From many publications can be deduced that FDI has an impact on enhancement of human capital, especially in developing countries. The economic growth of

India averaged 1.67 percent from 1996 to 2016. The economic growth has been based primarily on tertiary sector (services). Trade, communication, financing, insurance, business services and social and personal services account for approximately 60 percent of GDP. Primary sector of India generates around 12 percent of the output. Total gross enrollment in primary education was 108 percent (some students were repeating), 74 percent in secondary education and only 25.5 percent in tertiary education (mainly due to high poverty level). India, as a developing country, typically lacks the skill sets and knowledge required to adopt new technology and to implement it to the local environment. Thus, implementing a learning process becomes a necessity. More than 50 % of Indian children drop out of school at primary level. This is caused by a lack of literacy and a failure of governmental education programs within the country (National Portal of India, 2015). According to the official government programme, the level of expenditure for education in India should be 6 % of its GDP. However, the reality is that only 3 % of the GDP is spent on education. Therefore, it is very important to clarify the relationship between education and economic growth and how they influence each other. In the first part of this work there is a literature review and the issue of the topic is discussed. The next part focuses on analysis of the data collected and the last part of the work is conclusion of the research. Focus will be on three different level of education which is quite unique approach. The information resulting from this innovative research is crucial as it might provide valuable information for the government in India, as there is an overhaul of education system taking place, to take actions in the direction that would lead country to more prosperous future as the education systems, and education in general, of the country influence economic growth of a country which also impacts foreign countries related to India. Relationship of education and economic growth will be examined on the basis of econometric models, specifically the Granger causality method and the cointegration method. There are numerous reasons why scholastic quality is deficient in India. That is the reason behind education system overhaul and various debates. Researchers debate whether changes in educational attainment levels affect the long-term growth rate of the economy. According to Wamboye (et al., 2015) education provides essential knowledge, techniques, skills and information for each individual to define their role toward family and society. In addition, education also provides the ability to combat such social, evils as ignorance, injustice, corruption, violence, disparity and communalism, which many times serve as obstacles to the progress of a nation and economic growth. Increase of employment and focus on structuralizing of the economy are key tools how to increase the level and quality of education. Encouraging and expanding opportunity for career training are crucial too. Another issue is that education is not free for all Indians, for instance, education in the technical area is one of the most important and also one of the most expensive branches in India. Tools mentioned above need a government support in order to be successful for the economic growth.

MATERIALS AND METHODS

This paper examines the impact of education levels on economic growth in India between 1975 to 2016. It also analyzes the gender issue in regards to education and economic growth within the country. The evaluation of the impact of the primary, secondary and tertiary education on economic growth is conducted. Enrolment rates and average years of schooling

at every level will be used to measure as a proxy for human capital stock. Growth rate and gender are measured as the change in the mean years of schooling.

Data used in the empirical part were collected from the World Development Indicators database which is provided by the World Bank. It contains the enrolment variables and GDP product value at market prices (2005 constant USD). The time period for which the data are analyzed is from 1975 to 2016. The data for GDP per capital are annual values. However, data on average years of schooling are available only at five-year intervals.

Granger Causality

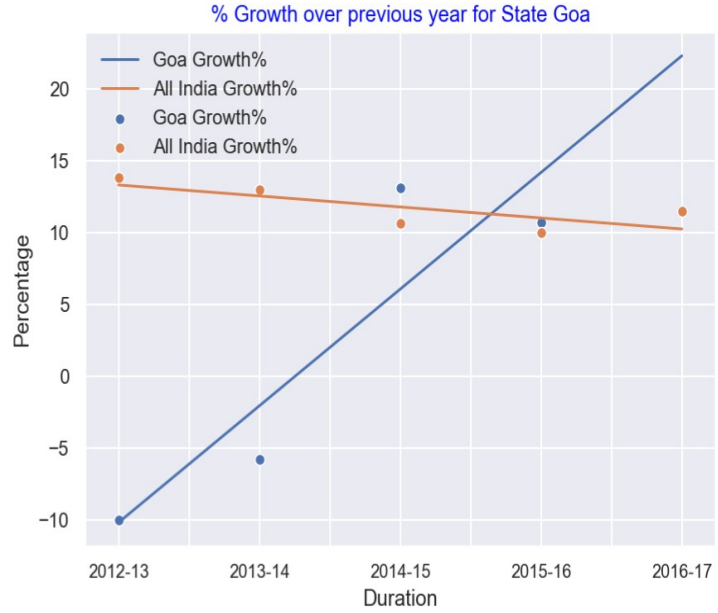
Granger (1969) defined causality as testing whether there is an influence of lagged information on a variable X which provides statistically significant information about a variable Y in the presence of lagged Y. In order to determine the causal relationship between education and economic growth, the following hypothesis is tested:

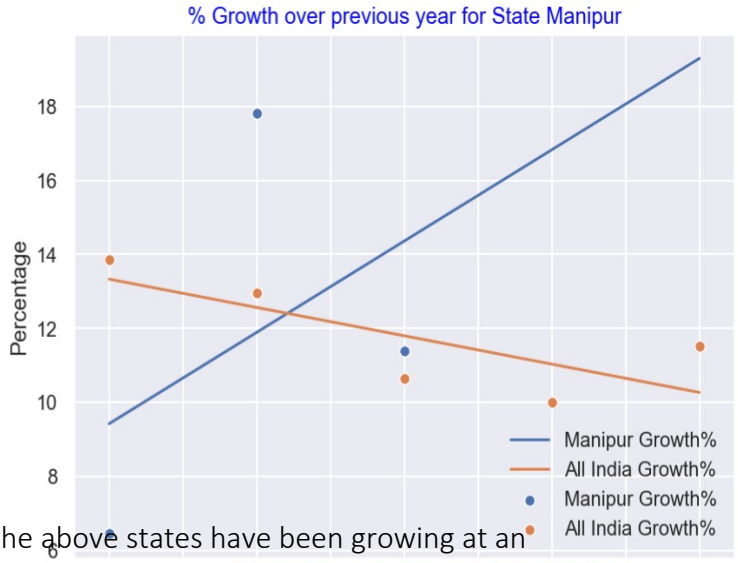
Δy represents the first difference of the log of per capita GDP, Δz represents the first difference of the log of the capital labour ratio, and Δx represents the first difference of the log of the education variables for each education level, m and n are orders of lag for appropriate variables.

GDP Analysis of the Indian States

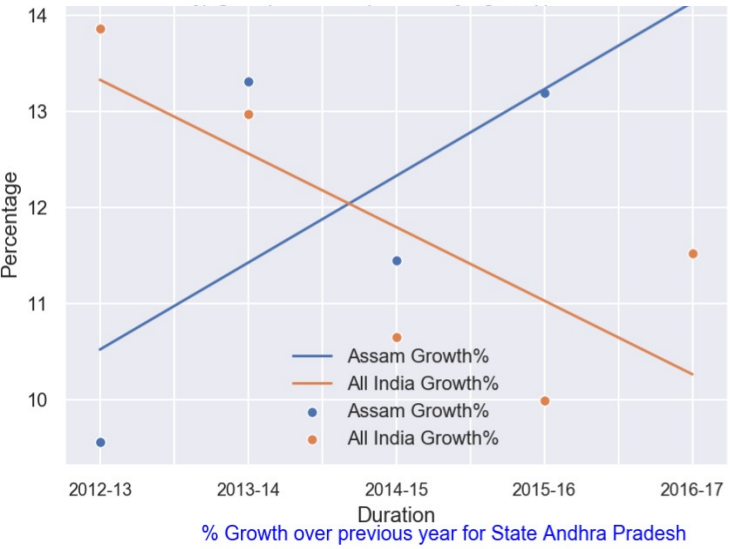
- There is an overall decreasing Trend in the growth of GDP for states
- All India Growth% has decreased from year 2012-13 till 2016-17
- In comparison to All India Growth%, states like Goa, Manipur, Tripura, Jammu & Kashmir, Assam, Meghalaya, Tripura are doing better with positive trend in Growth%
- States like Maharashtra, Nagaland, Gujarat, Himachal Pradesh, Karnataka have negative trend in Growth%

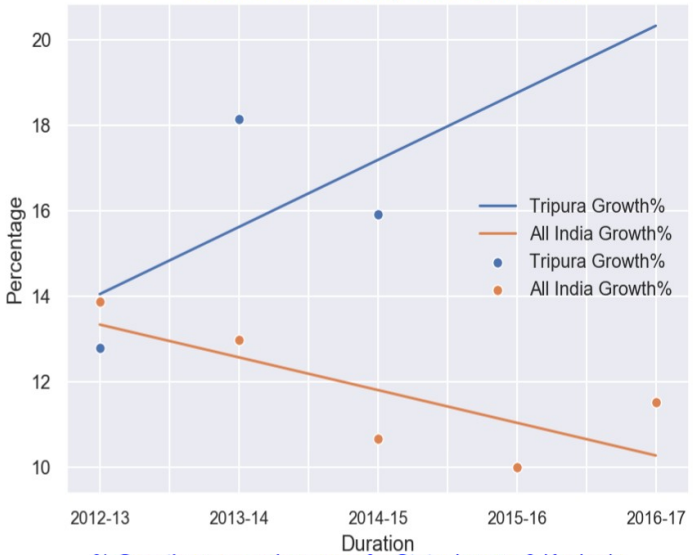
%Growth over previous years of top ranked states with Positive trend

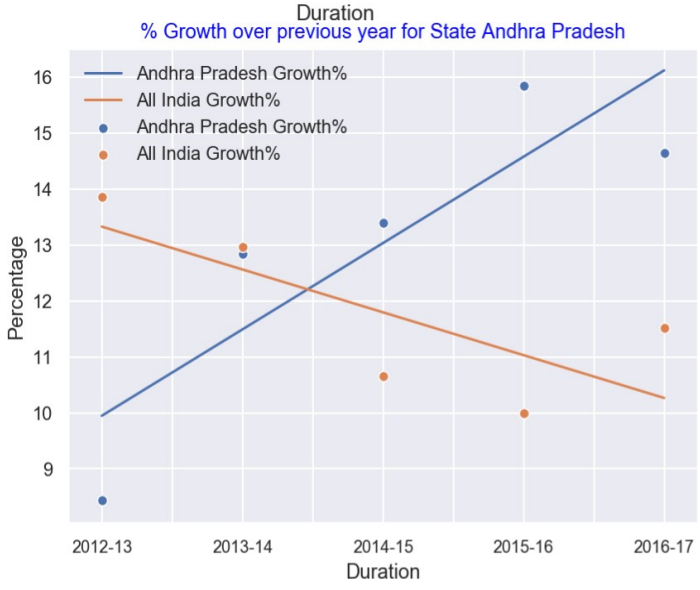


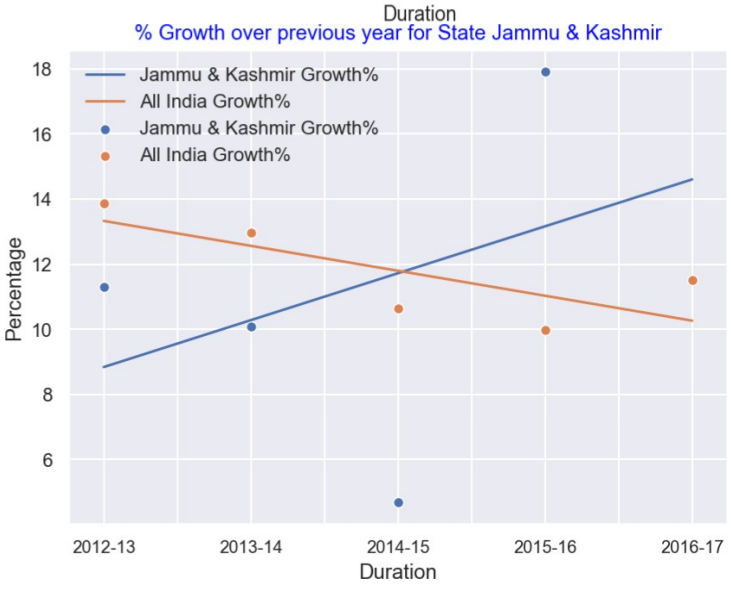


ve, the above states have been growing at an









unprecedented range. This could be possible due to multiple factors – low base, non-dependence on external factors etc.

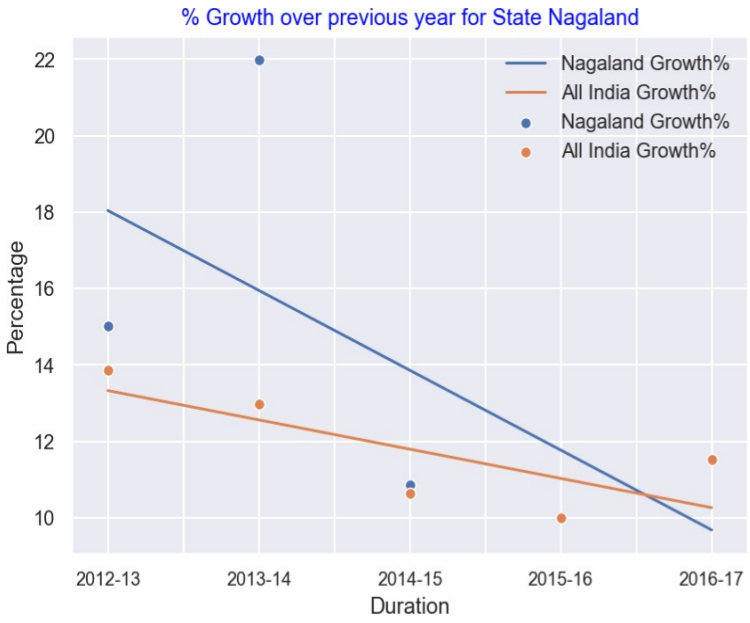
Analyses *of model*

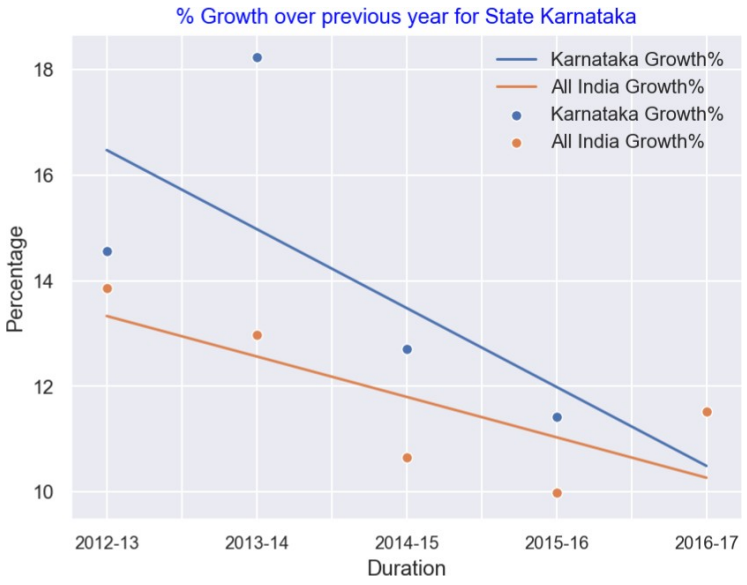
The model is specifying the impact of primary, secondary and tertiary education on economic growth. The dependent variable is GDP per capital. Individual equations aim to explain the GDP per capital development in relation to education and human capital stock at all levels and also with respect to gender and fertility rate issues. Endogenous variable is: Y = GDP per capita (in constant 2005 USD).

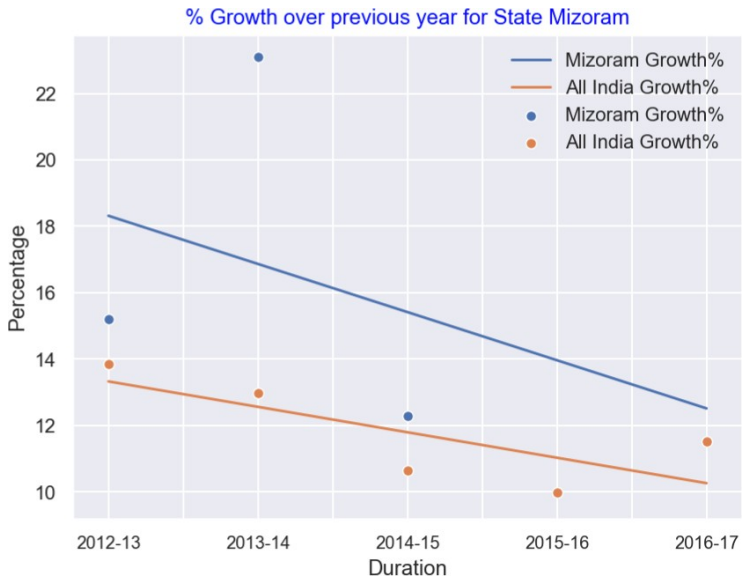
Statistical description of variables

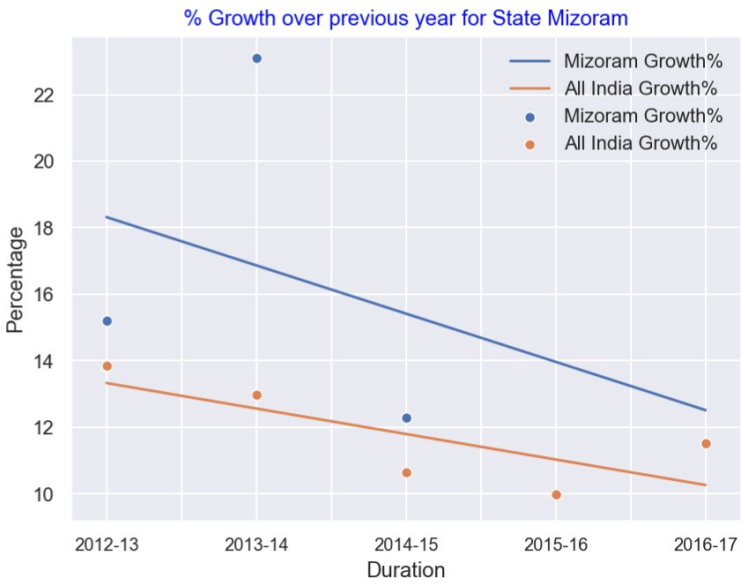
Initially, independent variables have been tested for the presence of multicollinearity. A correlation matrix has been created. Surprisingly, no values of correlation between the variables exceeded 0.7 and hence the authors kept all variables in the model in unchanged form.

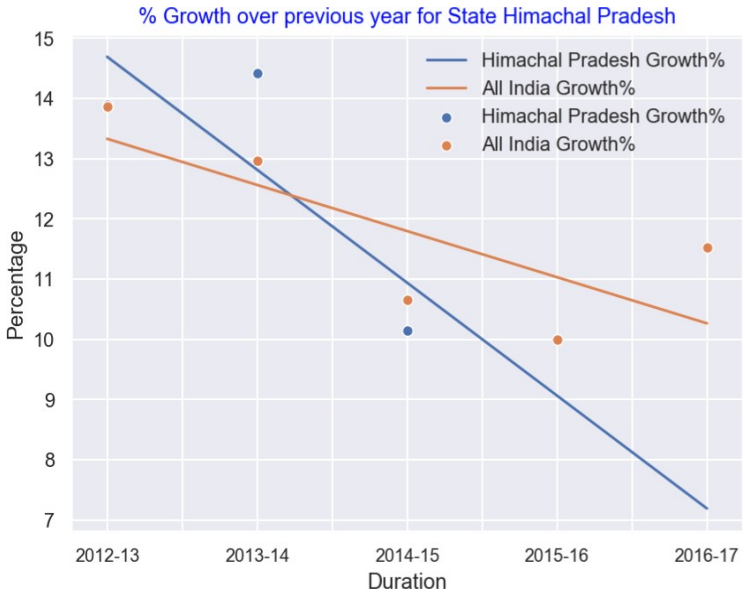
Human capital stock is measured in relations to the educational attainment level, with the average years of education level from the age of 15 and above. According to Self and Grabowski (2014), the human capital stock measure is typically lower then the enrolment rate and it shows the difference between male and female population.

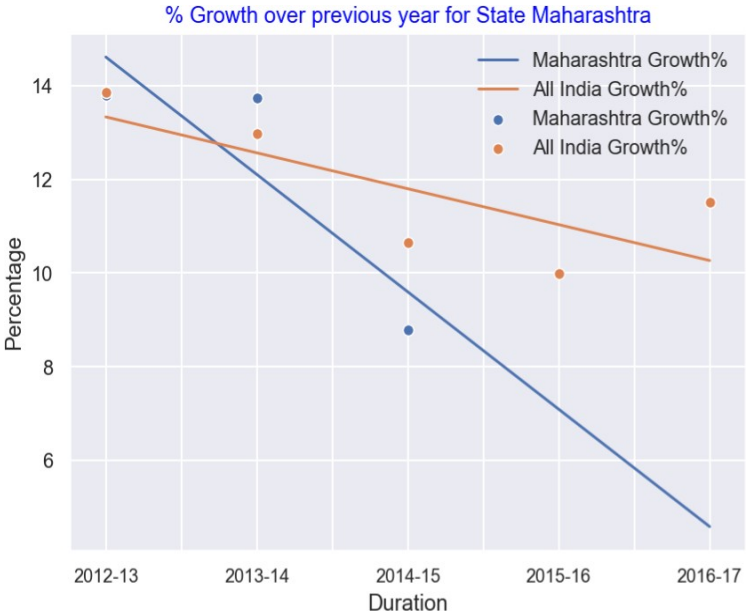












One of India's largest state Maharashtra has been de-growing more than India's national average. Other states like Gujarat, Karnataka are also showing negative growth. Mizoram has been de-growing but still not at par with national average (perhaps base effect).

Primary education and growth

This is not closely correlated with economic growth. However, the gross enrolment rate for primary females with and without fertility rate has a casual impact on capital stock, which means that primary education has an indirect impact on economic growth with a 95 % chance of probability.

Secondary Education and Growth

There are displayed results which suggest that there is not a large difference between the primary and secondary level of education in terms of their impact on the economic growth. On the other hand, there is a significant impact of gross enrolment rate for secondary level of educations of female population with and without fertility rate on the human capital stock with 96 % probability. Also, for human capital stock, it showed that the secondary female education negatively affects the number of children born with 95 % probability.

Tertiary Education and Growth

There are depicted results of tertiary education that strongly correlate with economic growth. The female population at the tertiary level of education, for both variables with and without the inclusion of the fertility rate variable, reflects a causal long term impact on the economic growth. However, for the male population results showed positive correlation with the economic growth only for the enrolment rate. On the other hand, the impact of the average years of tertiary education on the economic growth can be seen only in the short term period.

DATA AND METHODOLOGY

To identify and estimate the causal relationship, two variables are taken into consideration: i.e. *GDP* (India's gross domestic product, in Rupees at current price) and *EXE* (India's educational expenditure in Rupees at current price) over the period of 1950-51 to 2014-15 with a sample 64 years. The data on GDP are taken from Reserve Bank of India (RBI) while educational expenditure data are from various government reports and transformed into natural logarithm for analysis purpose.

The proposed model with Y = ƒ (Educational Expenditure) has been tested. Where, Y is taken as the log value of GDP and educational expenditure with log value as EXE. The formal linear model can be developed as below.

$$LNGDP = \beta 1 + \beta 2\ LNEXE + \varepsilon t \quad \ldots\ldots\ldots (1)$$

In the present study, the Model one is a relationship between *GDP* in current value and *EXE* in current value. There are reasons for this selection. Firstly, due to flaws that may exist in the statistical data, *GDP* or *EXE* in current values could ensure a more precise measurement compared to *GDP* or *EXE* in real values. Besides, the Indian government does not provide an official version of the GDP price deflator (Keidel 2001:355). Secondly, the previous analyses of educational spending-development relationship used the ratio variables, such as the growth of *GDP* or the *EXE*'s share in *GDP*. This can pose methodological problems because these two variables have same denominator.

In order to check causality, the definition given by Granger has been used. *xi* causes *yi* if the prediction of *yi* based on knowledge of the past values of *xi* and *yi*. The choice of the estimation's method is dictated by the nature of the variables. If they are stationary, then the VAR has been employed. In considering the two variables *xi* and yi*,* the VAR process takes the following form:

$$xt = c1 + \delta pi{=}1 \mathrm{i} xt\text{-}i + \varphi pi{=}1 iyt\text{-}i + e1t \quad \ldots\ldots\ldots (2)$$

$$yt = c2 + \alpha pi{=}1 \mathrm{i} yt\text{-}i + \beta pi{=}1 ixt\text{-}i + e2t \quad \ldots\ldots\ldots (3)$$

where$e1t$ and $e2t$ are white noise and *p* refers to the lag length. The null hypothesis of the Granger test is that the variable *yt* does not affect *xt*:

$$H0 : \varphi 1 = \varphi 2 = \ldots\ldots\ldots = \varphi p = 0 \quad \ldots\ldots\ldots (4)$$

It is also possible to test the absence of causality of *xt* on *yt*:

$$H0 : \beta 1 = \beta 2 = \ldots\ldots\ldots = \beta p = 0 \quad \ldots\ldots\ldots (5)$$

Through the hypothesis (3) and (4), four possible outcomes are considered:

If the hypothesis (4) is rejected and if the hypothesis (5) is accepted, then *yt* causes *xt*, it is a unidirectional causality.

☐ If (4) is accepted and if (5) rejected, then *xt* causes *yt*, causality is again

unidirectional.

- ☐ If (4) and (5) are accepted, then there is no causality between *xt* and *yt*.
- ☐ If (4) and (5) are rejected, then the causality is bidirectional, also called feedback.

This method requires stationarity of series. Moreover, numerous macroeconomic variables have a unit root and so are not stationary. To implement the Granger causality test with non-stationary series, the co-integration framework needs to be used. There is a co-integration relationship between two non-stationary variables *xt* and *yt* if a linear combination of *xt* and *yt* is stationary. The existence of a co-integration relationship does not yet detect the direction of causality. To test VECM (Vector Error Correction Model) has to be used, which is in following form:

$$\Delta xt = c1 + \delta pi=1 i \Delta xt\text{-}i + \varphi pi=1 i \Delta yt\text{-}i + \gamma 1 ECT + e1t \quad \ldots\ldots\ldots (6)$$

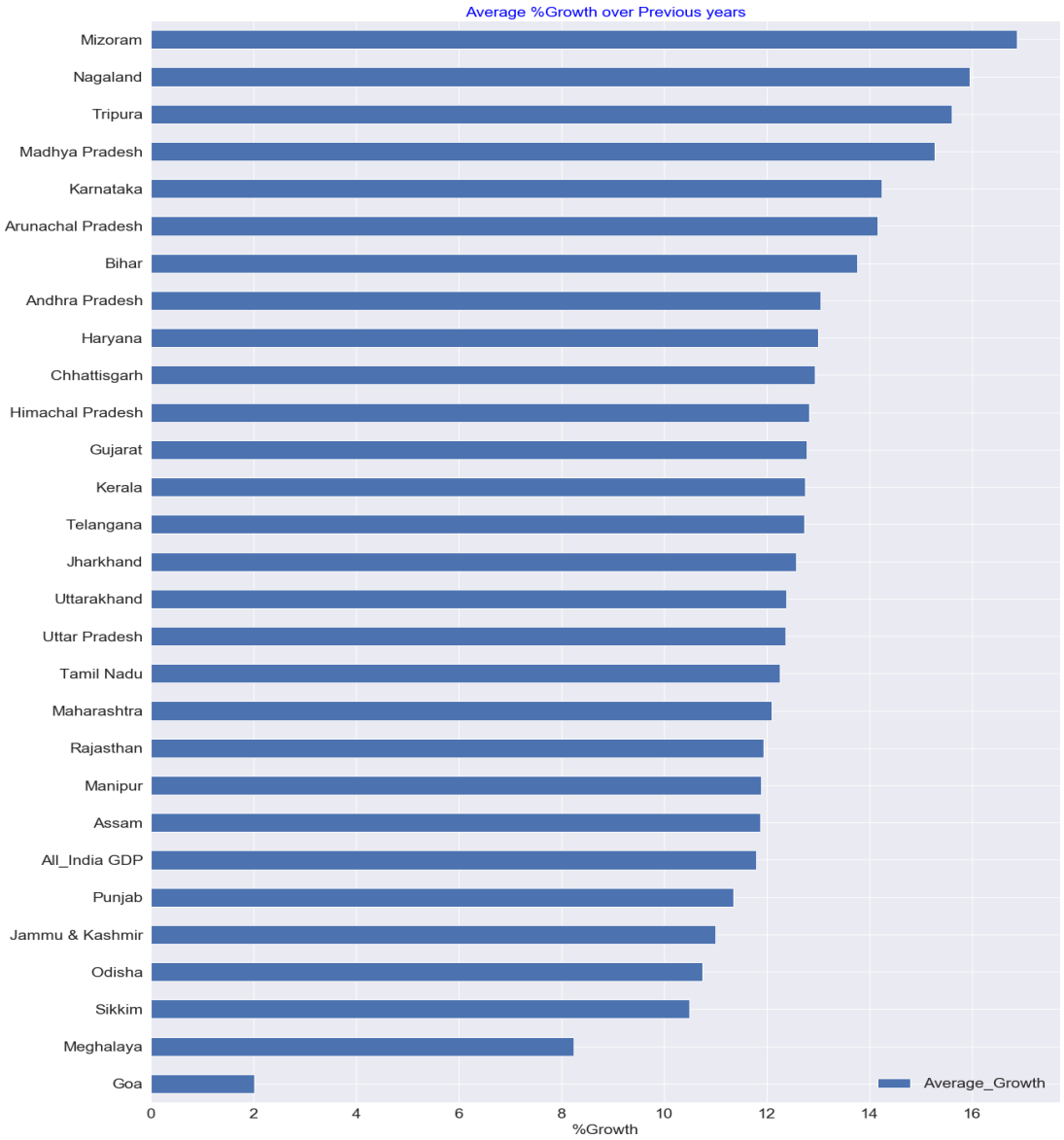
$$\Delta yt = c2 + \alpha pi=1 i \Delta yt\text{-}i + \varphi pi=1 i \Delta xt\text{-}i + \gamma 2 ECT + e2t \quad \ldots\ldots\ldots (7)$$

where *ECT* refers to Error Correction Term, which may be interpreted as the adjustment effect. It is important to note that all the terms in the equation (6) and (7) are stationary. Indeed, *xt* and *yt* are in difference and *ECT* must be stationary to fit the concept of co-integration.

This term offers a new channel to study causality, since variables have common trend. So, a test is necessary to see if the *ECT* is significant or not. For short-run causality as both the series are in difference, the same test is used as previously in the VAR context (the hypothesis (5) and (4) apply).

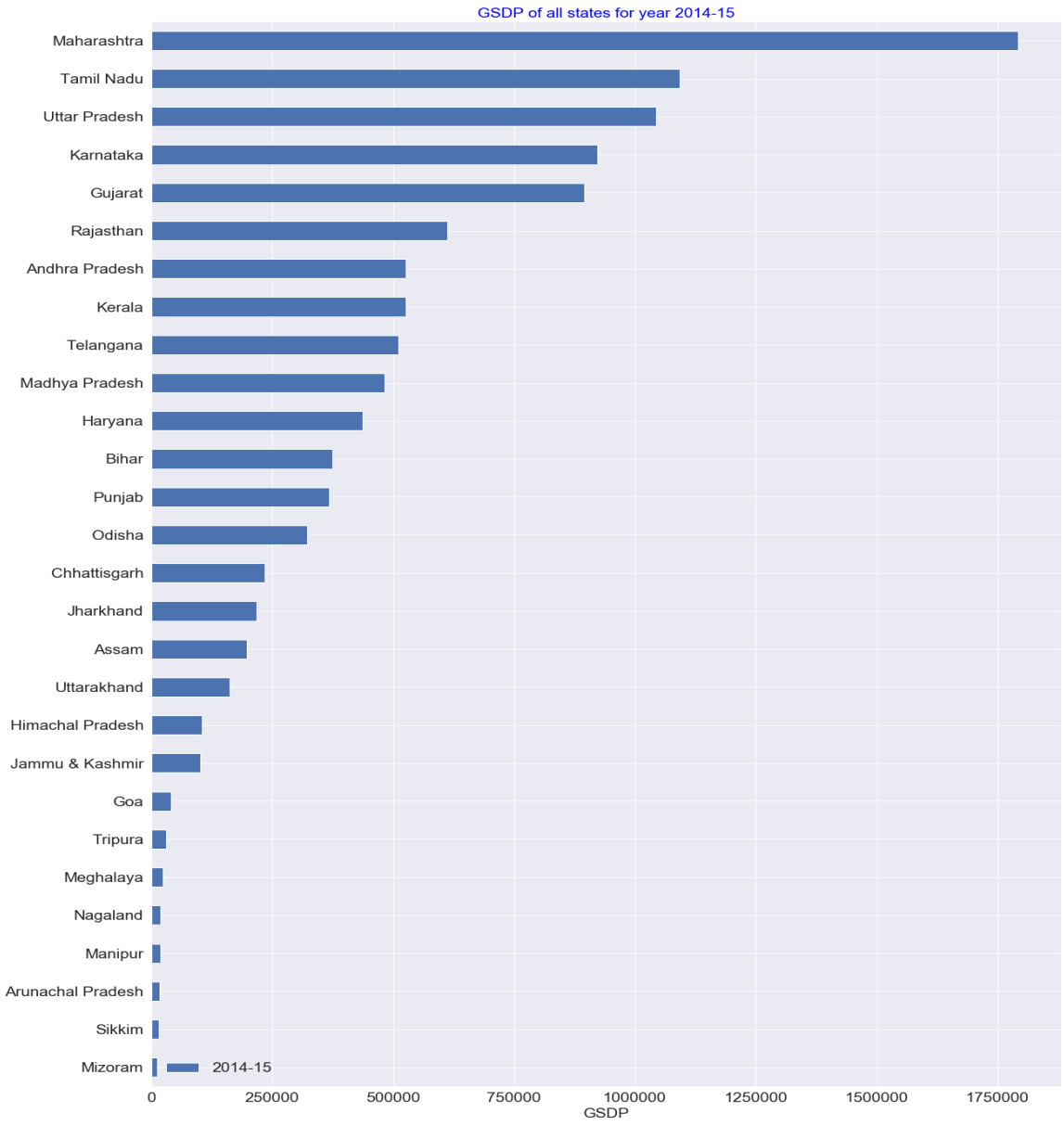
Average %Growth over Previous Years

Average Growth Rate of my home state Haryana(13.0%) is more than All India GDP average growth rate. There was a sudden decrease in growth rate from 15.45% in 2013-14 to 9.18% in 2014-15. But after that there has been increase in growth rate with 10.91% in 2015-16 to 12.82% in 2016-17. This has resulted in average growth rate of 13% and is ranked as 9th highest in average growth Percentage over previous years.



State of Mizoram(16.87%) has highest average growth percentage rate over previous years followed by Nagaland(15.95%), Tripura(15.61%). State of Goa(2.02%) has the lowest average growth percentage followed by Meghalaya(8.24%) second lowest and Sikkim(10.49%) third lowest in average growth percentage over previous years. All India GDP average growth rate is 11.87%

GDP of all States



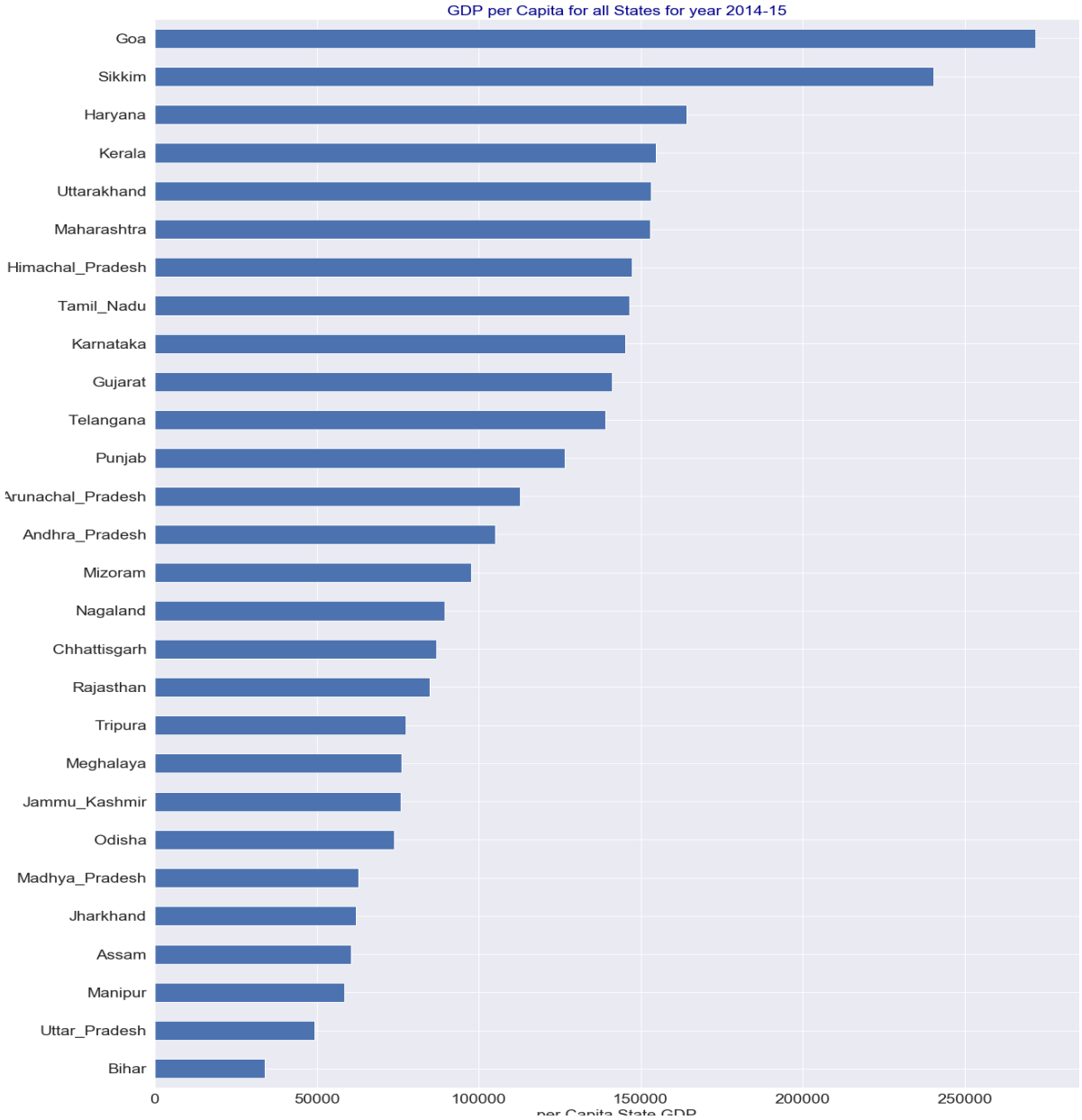
For the year of 2014-15:

•GSDP of state Maharashtra(1792122.0) is highest followed by Tamil Nadu(1092564.0) and then Uttar Pradesh(1043371.0)

•GSDP of state Mizoram (11559.0) is the lowest followed by Sikkim(15209.0) as 2nd lowest and Arunachal Pradesh(16761.0) as 3rd lowest

•Government needs to focus on increasing GSDP of these lowest ranking states. Measure for growth improvement needs to be brought in for these states.

GDP per Capita of all States



For the year of 2014-15:

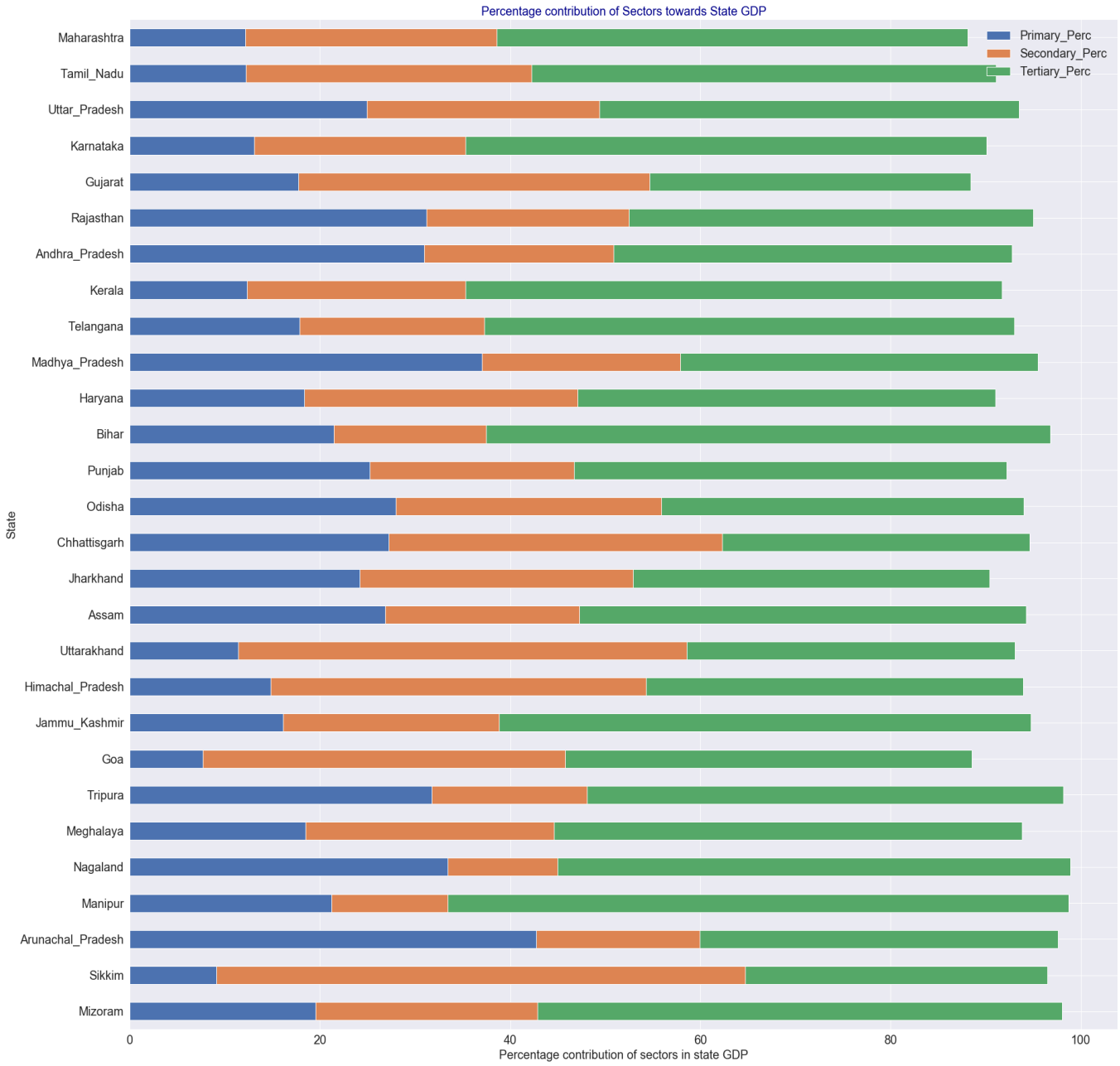
• Goa(271793) has the highest per Capita GDP in Rs, followed by Sikkim(240274) and Haryana(164077), Kerala(154778) and Uttarakhand(153076)

• Bihar(33954) has the lowest per Capita GDP in Rs , followed by Uttar Pradesh(49450), Manipur(58442), Assam(60621) and Jharkhand(62091) in that order.

• As from previous slide, even though Sikkim has 2nd lowest GSDP, it has the 2nd highest GDP per Capita

• GSDP of Maharashtra is highest for year 2014-15 but GDP per Capita for this state is 6th highest

%Contribution of Sector to State GDP



For the year of 2014-15:

• Maharashtra has highest GDP(179212165) followed by Tamil Nadu(109256373) and Uttar Pradesh(104337115).

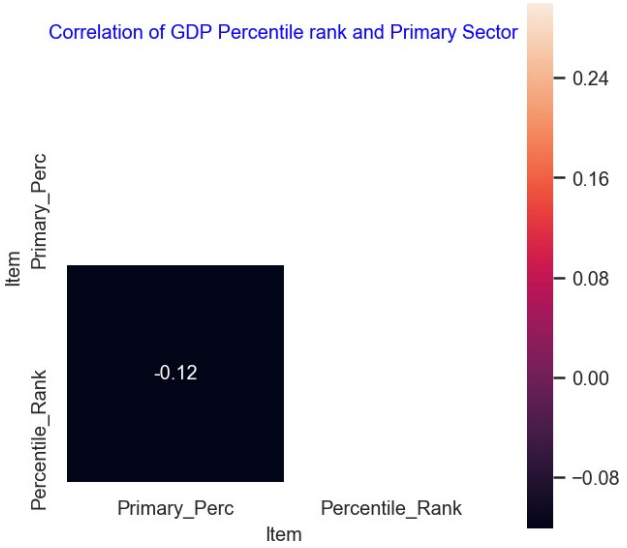
• Tertiary sector is the main contributor to Maharashtra, Tamil Nadu and Uttar Pradesh states GDP

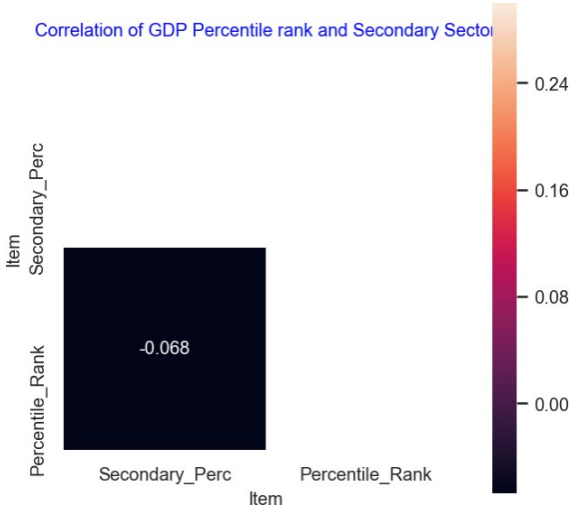
• Highest contribution from Primary sector is for State Arunachal Pradesh(42.77%)

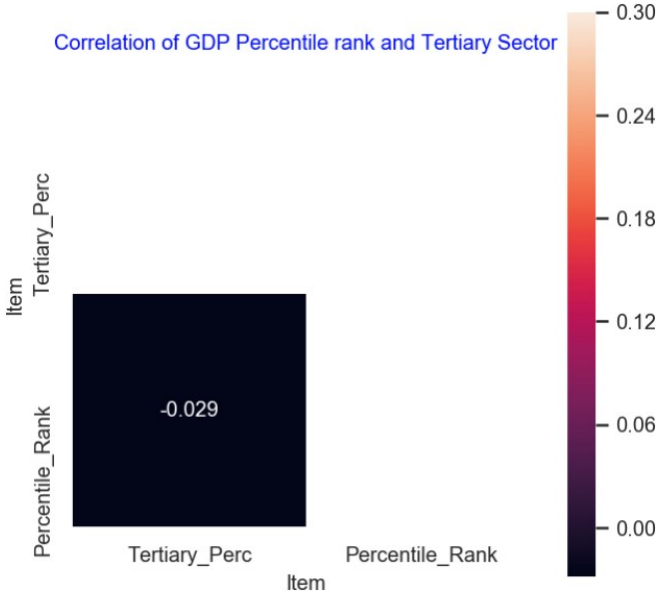
• Highest contribution from Secondary Sector is for State Sikkim(55.57%)

• Highest contribution from Tertiary Sector is for State Manipur (65.25%)

Correlation between State GDP Percentile rank and %Contribution of Primary, Secondary and Tertiary Sectors







- There is negative correlation(-0.12) between percentile rank of state GDP and Primary Sector Contribution. With Lower GDP, the %contribution of Primary Sector is higher and vice versa
- There is negative correlation(-0.068) between percentile rank of state GDP and Secondary Sector Contribution. With Lower GDP, the %contribution of Secondary Sector is higher and vice versa
- There is negative correlation(-0.029) between percentile rank of state GDP and Tertiary Sector

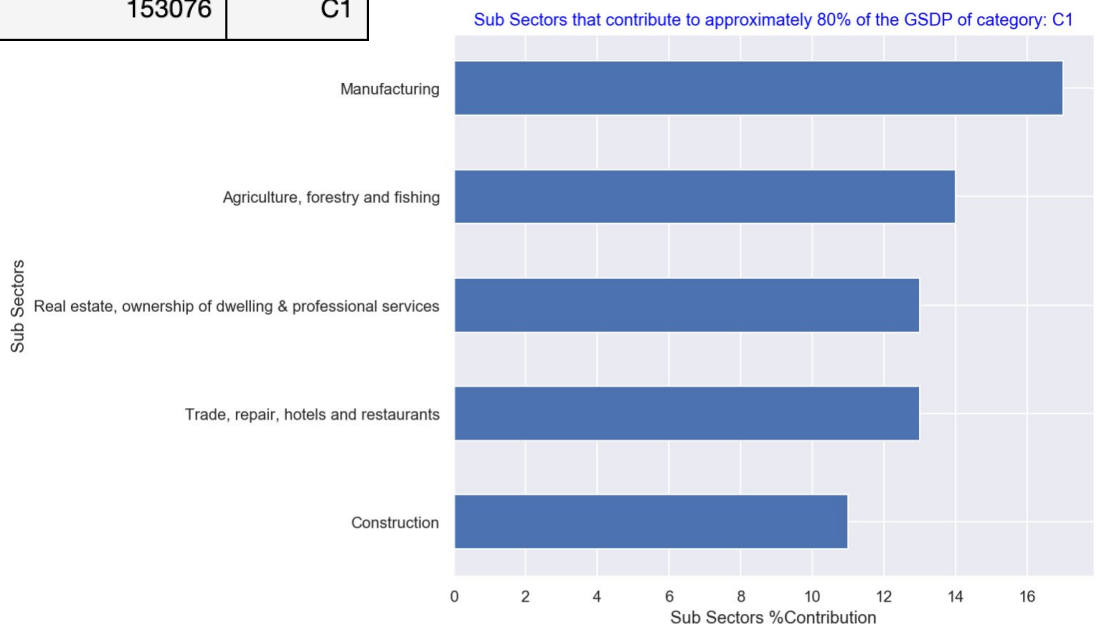
Contribution. With Lower GDP, the %contribution of Tertiary Sector is higher and vice versa

- Amongst three sectors, Primary Sector is most negatively correlated. In other words with lower State GDP, the %Contribution of Primary Sector is most

Sub Sectors contributing to appx. 80% of State GDP

States are categorized into four groups based on the GDP per capita (C1,C2,C3,C4, where C1 would have the highest per capita GDP and C4, the lowest). The states lying between the 85 th and the 100th percentile are in category C1.

State	Per Capita GSDP (Rs.)	Category
Goa	271793	C1
Sikkim	240274	C1
Haryana	164077	C1
Kerala	154778	C1
Uttarakhand	153076	C1

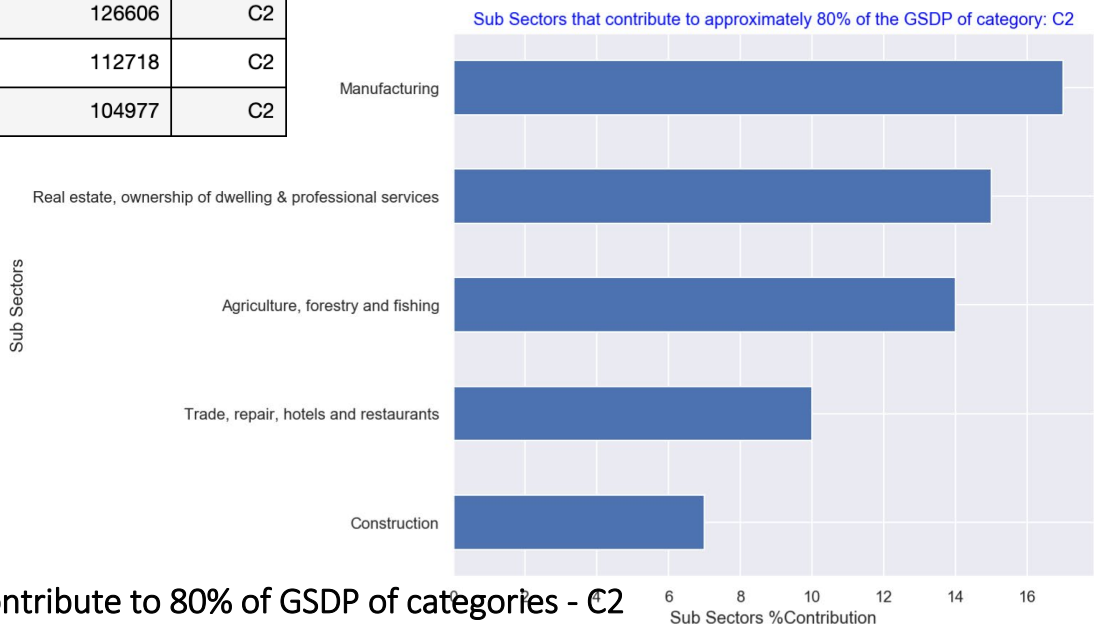


Sub sectors that contribute to 80% of GSDP of categories - C1

- Manufacturing
- Agriculture, forestry and fishing
- Real estate, ownership of dwelling & professional services
- Trade, repair, hotels and restaurants
- Construction

States are categorized into four groups based on the GDP per capita (C1,C2,C3,C4, where C1 would have the highest per capita GDP and C4, the lowest). The states lying between the 50 th and the 85 th percentile are in category C2.

State	Per Capita GSDP (Rs.)	Category
Maharashtra	152853	C2
Himachal_Pradesh	147330	C2
Tamil_Nadu	146503	C2
Karnataka	145141	C2
Gujarat	141263	C2
Telangana	139035	C2
Punjab	126606	C2
Arunachal_Pradesh	112718	C2
Andhra_Pradesh	104977	C2

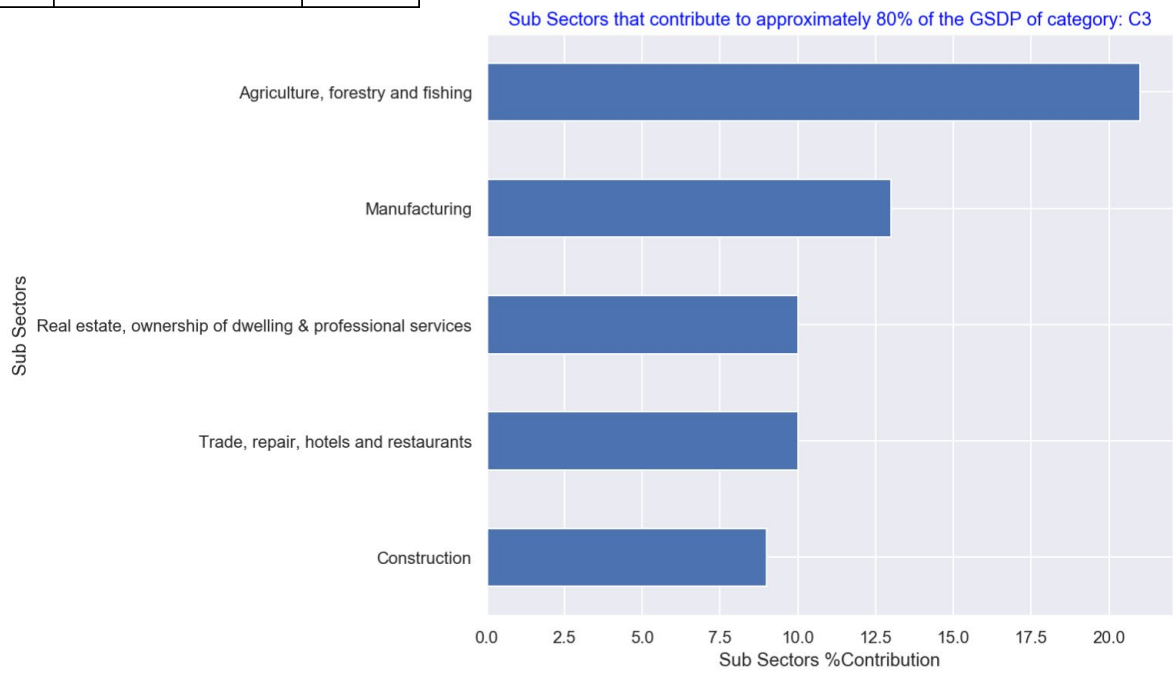


Sub sectors that contribute to 80% of GSDP of categories - C2

- Manufacturing
- Real estate, ownership of dwelling & professional services
- Agriculture, forestry and fishing
- Trade, repair, hotels and restaurants
- Construction

States are categorized into four groups based on the GDP per capita (C1,C2,C3,C4, where C1 would have the highest per capita GDP and C4, the lowest). The states lying between the 20 th and the 50 th percentile are in category C3.

State	Per Capita GSDP (Rs.)	Category
Mizoram	97687	C3
Nagaland	89607	C3
Chhattisgarh	86860	C3
Rajasthan	84837	C3
Tripura	77358	C3
Meghalaya	76228	C3
Jammu_Kashmir	75840	C3
Odisha	73979	C3

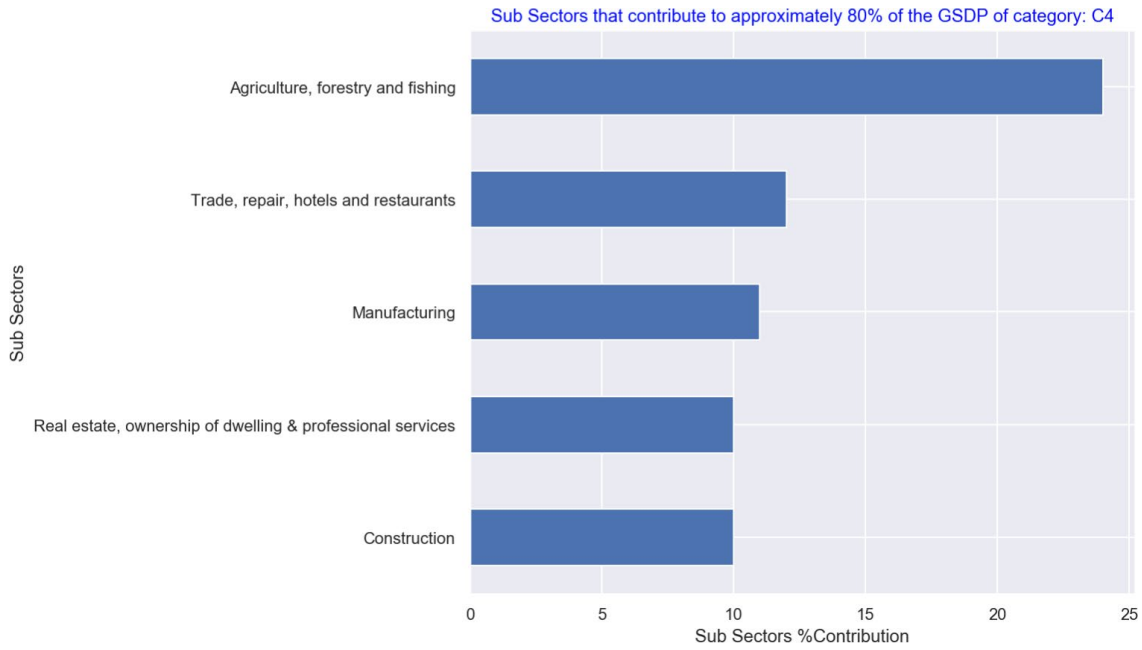


Sub sectors that contribute to 80% of GSDP of categories - C3

- Agriculture, forestry and fishing
- Manufacturing
- Real estate, ownership of dwelling & professional services
- Trade, repair, hotels and restaurants
- Construction

States are categorized into four groups based on the GDP per capita (C1,C2,C3,C4, where C1 would have the highest per capita GDP and C4, the lowest). The states lying between the 25 th percentile are in category C4.

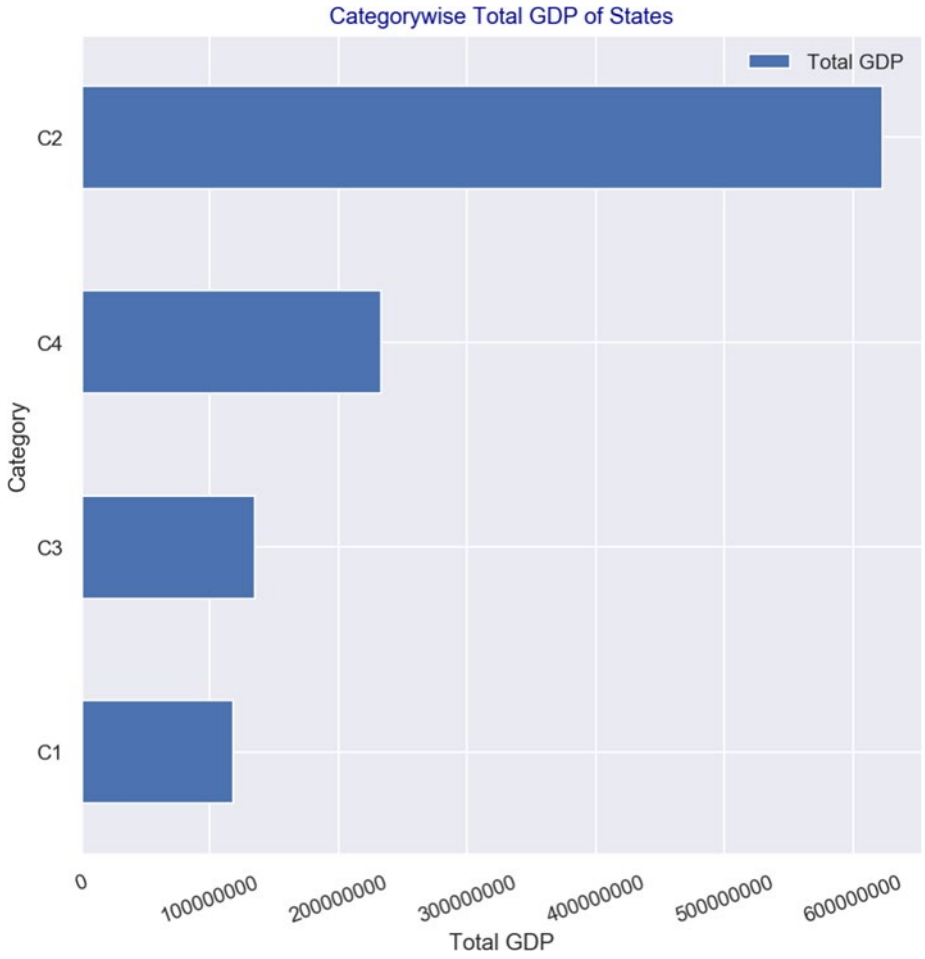
State	Per Capita GSDP (Rs.)	Category
Madhya_Pradesh	62989	C4
Jharkhand	62091	C4
Assam	60621	C4
Manipur	58442	C4
Uttar_Pradesh	49450	C4
Bihar	33954	C4



Sub sectors that contribute to 80% of GSDP of categories – C4

- Agriculture, forestry and fishing
- Trade, repair, hotels and restaurants
- Manufacturing
- Real estate, ownership of dwelling & professional services
- Construction

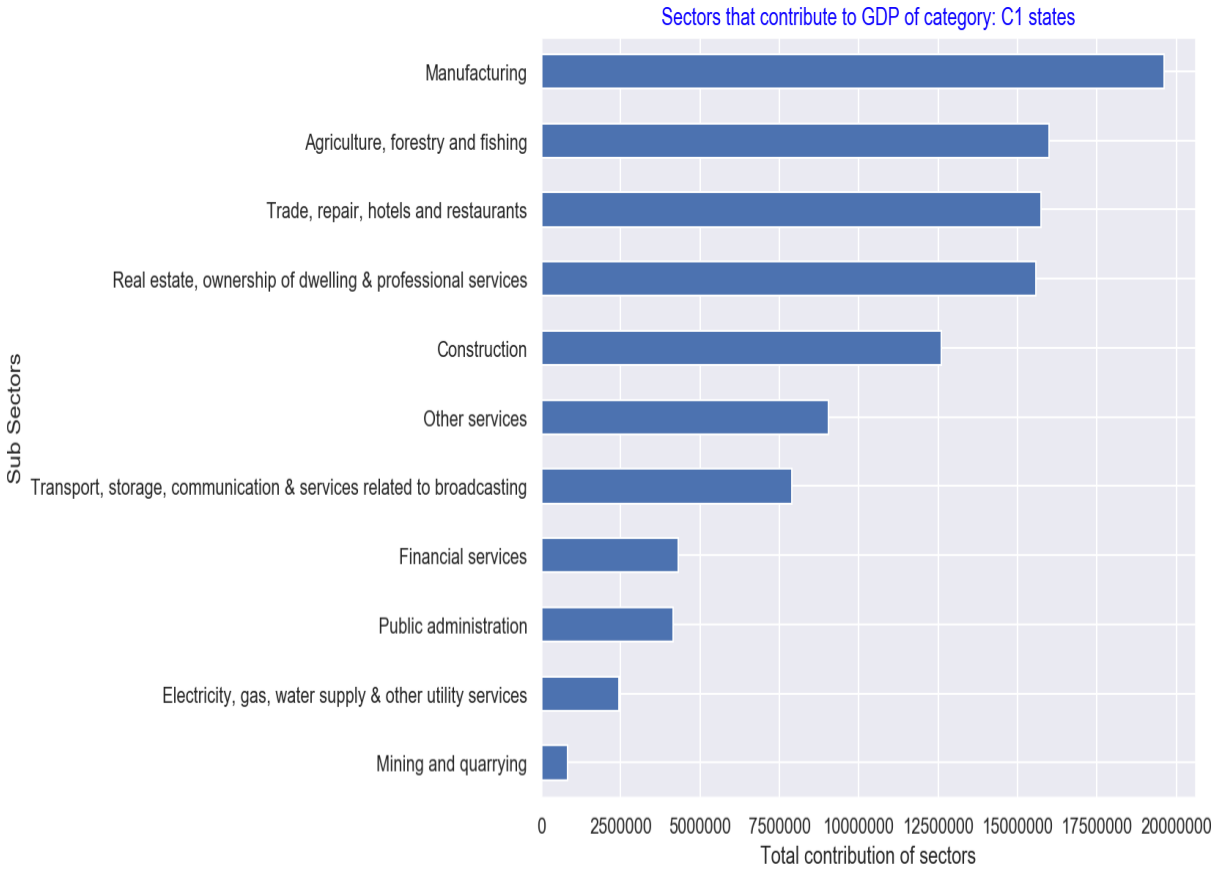
GDP Distribution of Categories – C1, C2, C3, C4



- States belonging to Category C2 (i.e. States between the 50th and the 85th percentiles of GDP per Capita) have higher GDP in comparison to states belonging to other categories

- States belonging to Category C1 (i.e. States between the 80th and the 100th percentiles of GDP per Capita) have lowest GDP in comparison to states belonging to other categories.

Sub Sector and category wise GDP correlation – Category C1



Highly performing sectors are

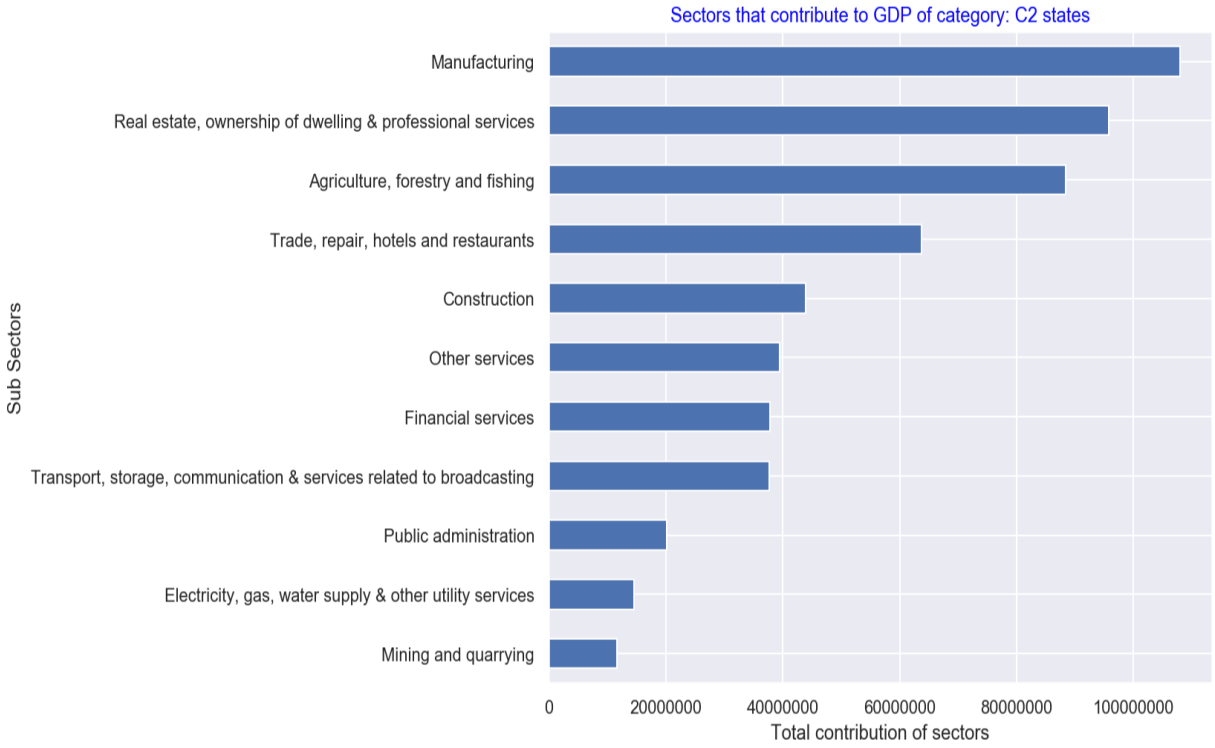
- Manufacturing
- Agriculture, forestry and fishing
- Trade, repair, hotels and restaurants
- Real estate, ownership of dwelling & professional services
- Recommendation - States must keep on focusing on Manufacturing, Agriculture by bringing efficiency and automation, Real Estate and Hotels, Restaurant to increase GDP growth

Low performing sectors are

Mining and quarrying

- Electricity, gas, water supply & other utility services
- Public Administration
- Recommendation - Government must focus on improving these sectors so that these sectors also start contributing more towards the growth of State GDP.

Sub Sector and category wise GDP correlation – Category C2



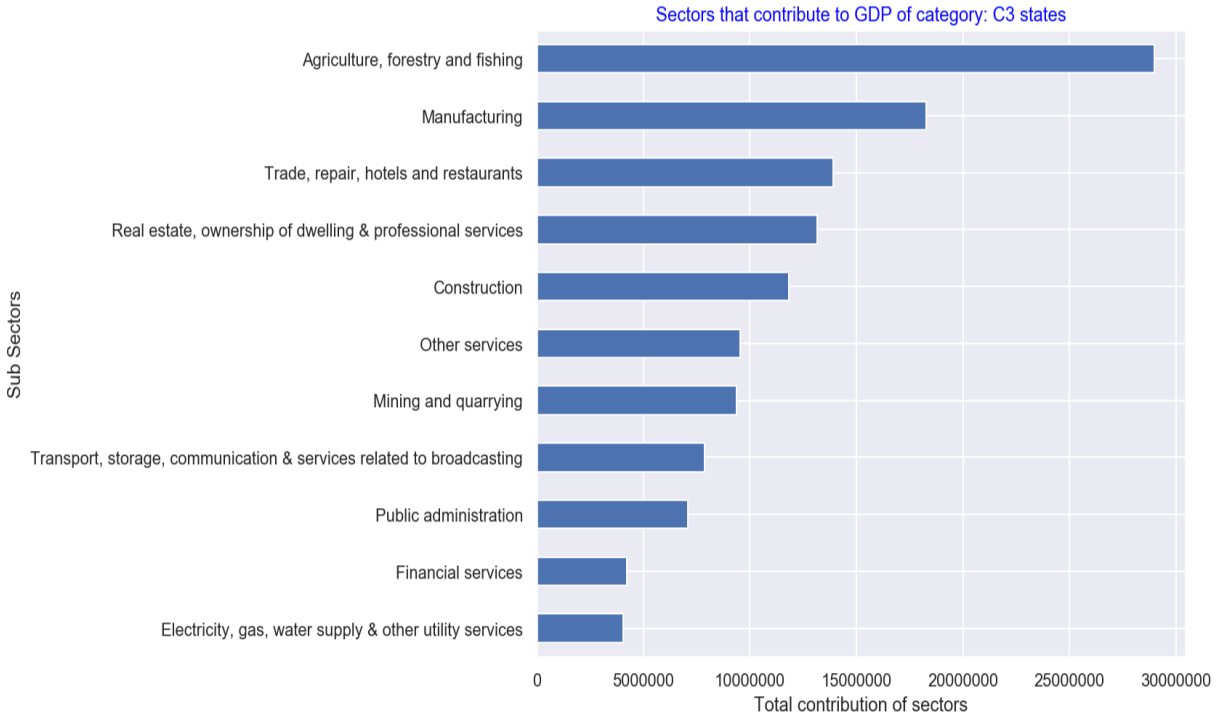
High performing sectors are

- Manufacturing
- Real estate, ownership of dwelling & professional services
- Agriculture, forestry and fishing
- Trade, repair, hotels and restaurants
- Recommendation - State must keep on focusing Manufacturing (bring skilled labor and automation) and Real Estate for category C2 states to increase state GDP

Low performing sectors are

- Mining and quarrying
- Electricity, gas, water supply & other utility services
- Recommendation - Government must focus on improving these sectors so that these sectors also start contributing more towards the growth of State GDP.

Sub Sector and category wise GDP correlation – Category C3



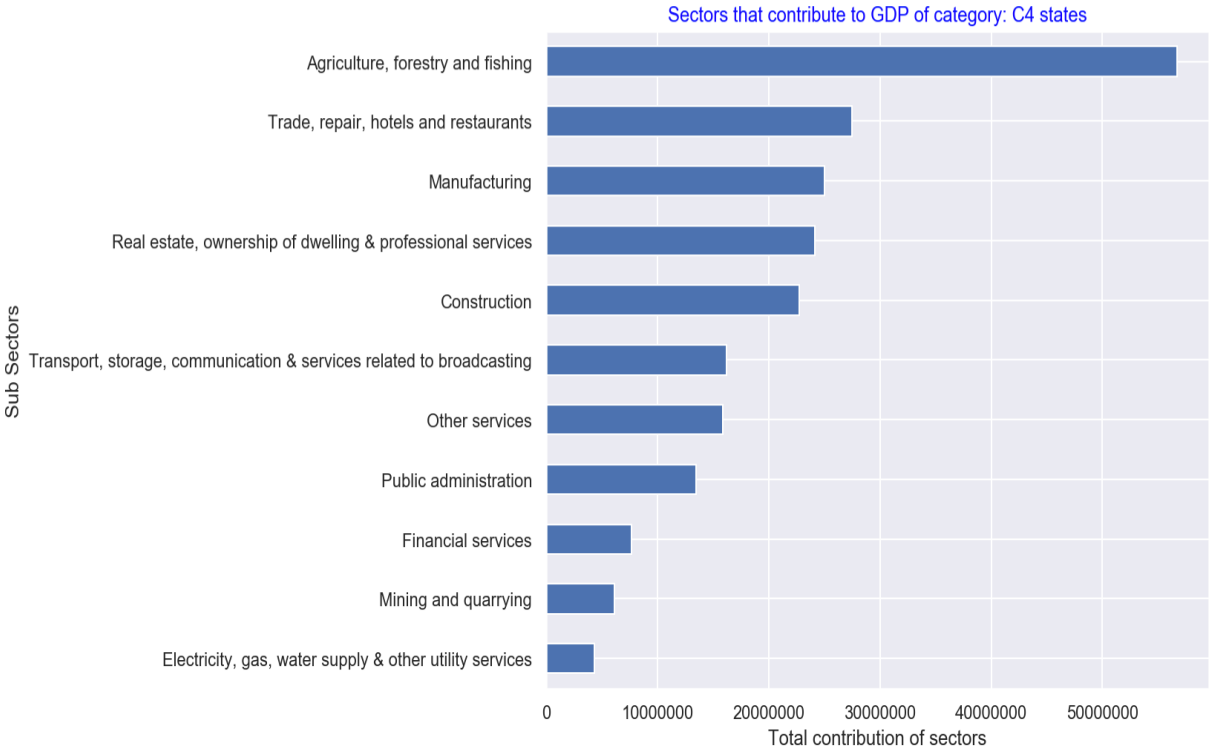
Highly performing sectors are

- Agriculture, forestry and fishing
- Manufacturing
- Trade, repair, hotels and restaurants
- Recommendation - Agriculture, forestry and fishing is the major contributing sector towards state GDP for category C3 states. Government must keep on focusing Agriculture to further increase it contribution towards State GDP

Low performing sectors are

- Electricity, gas, water supply & other utility services
- Financial Services
- Recommendation - Government must focus on Financial Services and also improving Utility Services sector so that these sectors can contribute more towards state GDP

Sub Sector and category wise GDP correlation – Category C4



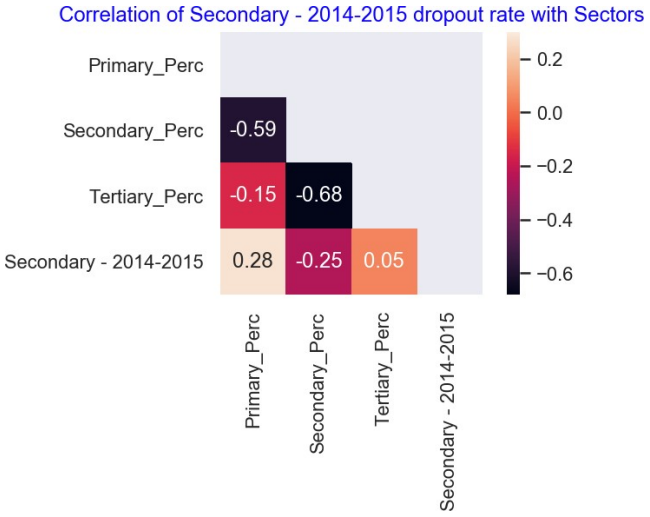
High performing sectors are

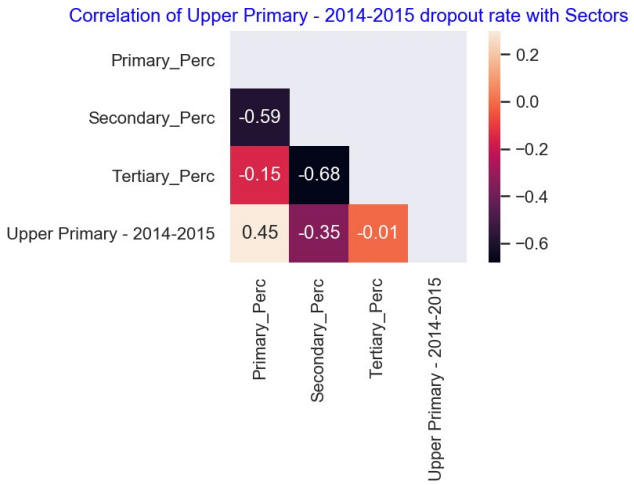
- Agriculture, forestry and fishing
- Trade, repair, hotels and restaurants
- Manufacturing
- Real estate, ownership of dwelling & professional services
- Recommendation - Government must keep on focusing Agriculture and bring measures and incentive to boost manufacturing to increase State GDP

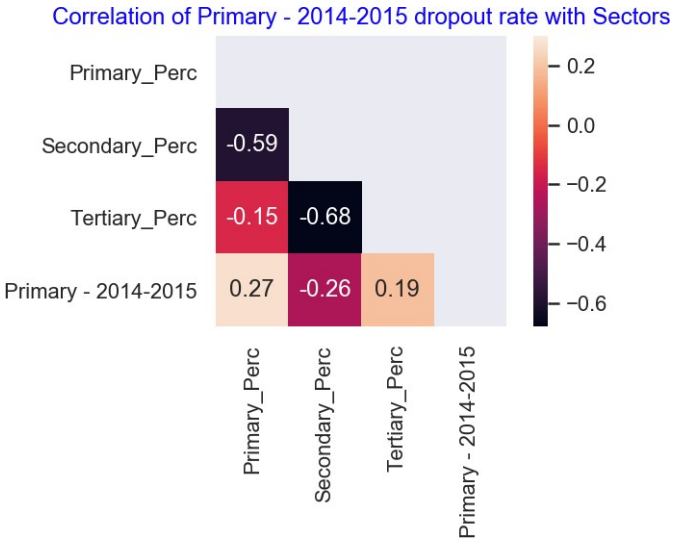
Low performing sectors are

- Electricity, gas, water supply & other utility services
- Mining and quarrying
- Recommendation - Government must focus on Utility and services sector and mining and quarrying sector to increase State GDP

Correlation between Education dropout rate and %Contribution of each Sector





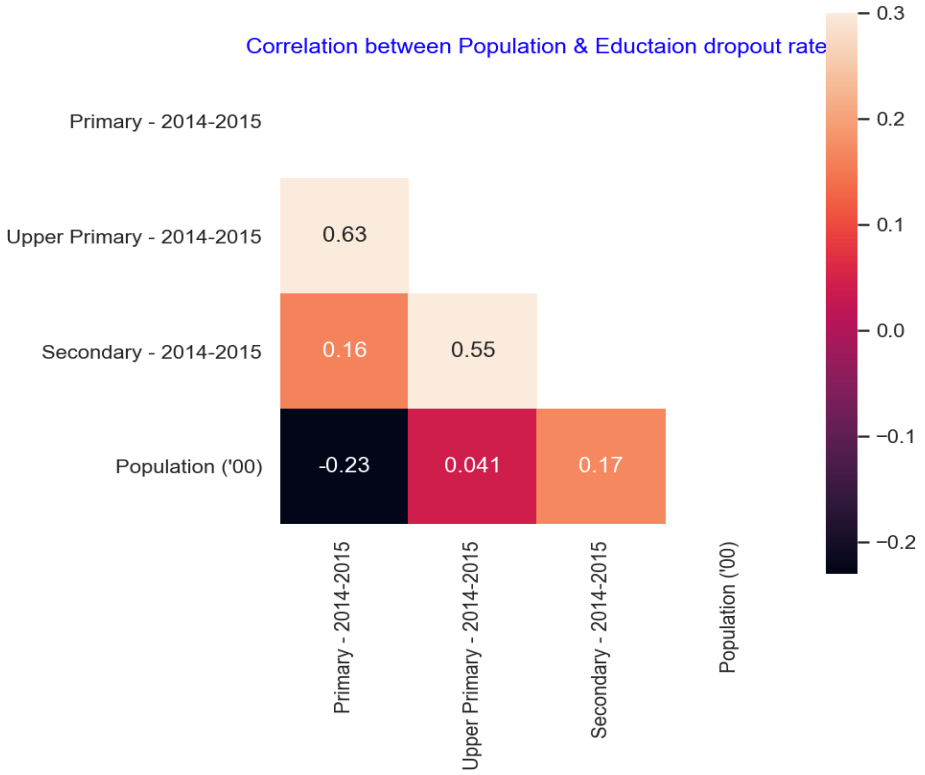


Dropout rate of Primary education level is negatively correlated (-0.26) with Secondary Sector %contribution. GDP of such states will decrease given the skilled and educated labor required for secondary sector is not easily available and thus doesn't encourage industries to be setup. However there is positive correlation (0.27) with Primary Sector %contribution. Given primary sectors rely on unskilled labor, a drop in primary schools creates a large labor pool helping primary sector and thus contribution to GDP growth.

Dropout rate of Upper Primary education level is negatively correlated(-0.35) with Secondary Sector %contribution. There is also a small negative correlation(-0.01) with Tertiary Sector %Contribution. This means with increase in dropout rate in Upper Primary education level, States with major contribution from Secondary Sectors will get affected. GDP of such states will decrease. However, there is positive correlation (0.45) with Primary Sector %contribution as per reason explained above.

Dropout rate of Upper Secondary education level is negatively correlated (-0.25) with Secondary Sector %contribution. This means with increase in dropout rate in Secondary education level, States with major contribution from Secondary Sectors will get affected. GDP of such states will decrease. However, there is positive correlation (0.28) with Primary Sector %contribution. This means with increase in dropout rate in Secondary education level, States with major contribution from Primary Sectors will see increase in GDP.

Correlation between education dropout rate and population



- Increase in population results in decrease (- 0.23) in Primary dropout rate
- Increase in population results in increase (0.17) in Secondary dropout rate
- Increase in population results in small increase (0.041) in Upper Primary dropout rate

- Increase in dropout rate negatively affects the Secondary sector and thereby GDP of states with major %contribution from secondary sector
- If the population increases, Secondary dropout rate also increases
- Per Capita decreases with increase in dropout rate

The government must bring in measures to control dropout rate which will help in increase in GDP of states.

CONCLUSION

The determinants of education at primary, secondary and tertiary level were analyzed in depth along with the economic growth in India. Quality education, along with the level of education, and its impact on the economy has been studied by many researchers and evidence from their publications show that education is an important factor in enhancing and promoting economic growth. This is true in many countries, especially in developing countries such as India. In order to test the hypothesis, GDP per capital was defined by the model as dependent variable on the capital stock, gross school enrolment rate and average years of schooling at every level of education for both genders. The autocorrelation and normality of the residuals test has been conducted. The p-value in all econometrics tests proved that the null-hypothesis cannot be rejected. Parameters were verified statistically, economically and econometrically.

Our results correspond with the results of Kingdon (2007) who examined the level of education in India and they correspond also with the results of Self & Grabowski (2004) proved that primary and secondary education is not just strongly correlated with the economic growth of the country but it also has a strong casual impact on the economic growth in India. Many other publications focused on researching the relationship of the level of education and economic growth of the country. Some publications also focused on the similar topic in broader region such as East Asia. Our results provided an evidence that with respect to education, economic growth of India is positively related to the starting level of average years of schooling of males and females at the tertiary level of education. The evidence shows that female education at all levels has the potential for generating economic growth. However, for males the result appears to have a causal impact on economic growth only at the tertiary level. When the results were verified and compared with the hypotheses, it was concluded that not all of the results support the two stated hypotheses. The first hypothesis was to verify whether the secondary education has a positive impact on economic growth in India, specifically for female population. However, after the analysis of the data gathered it was discovered that tertiary education causes an economic growth in India and it is true for both genders. On the other hand, from the results it is obvious that there is a significant impact of gross enrolment rate for secondary level of educations of female

population (with and without fertility rate) on the human capital stock. This most likely means that if women enroll in the study they tend to finish the studies which lead to higher human capital. This has another effect as for human capital stock, results showed that the secondary female education negatively affects the number of children born with 95 % probability.

The second hypothesis is that the level of education has an indirect impact on economic growth through the fertility rate in India. It was proven that fertility rate has an indirect impact on economic growth through the primary and secondary education of females. This proved the second hypothesis to be valid. This phenomenon could be explained many ways. One reason behind this could be that people with higher education might be more cautious and plan their future carefully which results also in planning of the family thus the fertility rate decreases as females proceed with higher levels of education.

PROJECT CODING

Code: https://github.com/UmaMaheswariBalasubramanian/ED_TECH

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