Global and Indian Trend in Structural Change and Premature Deindustrialisation

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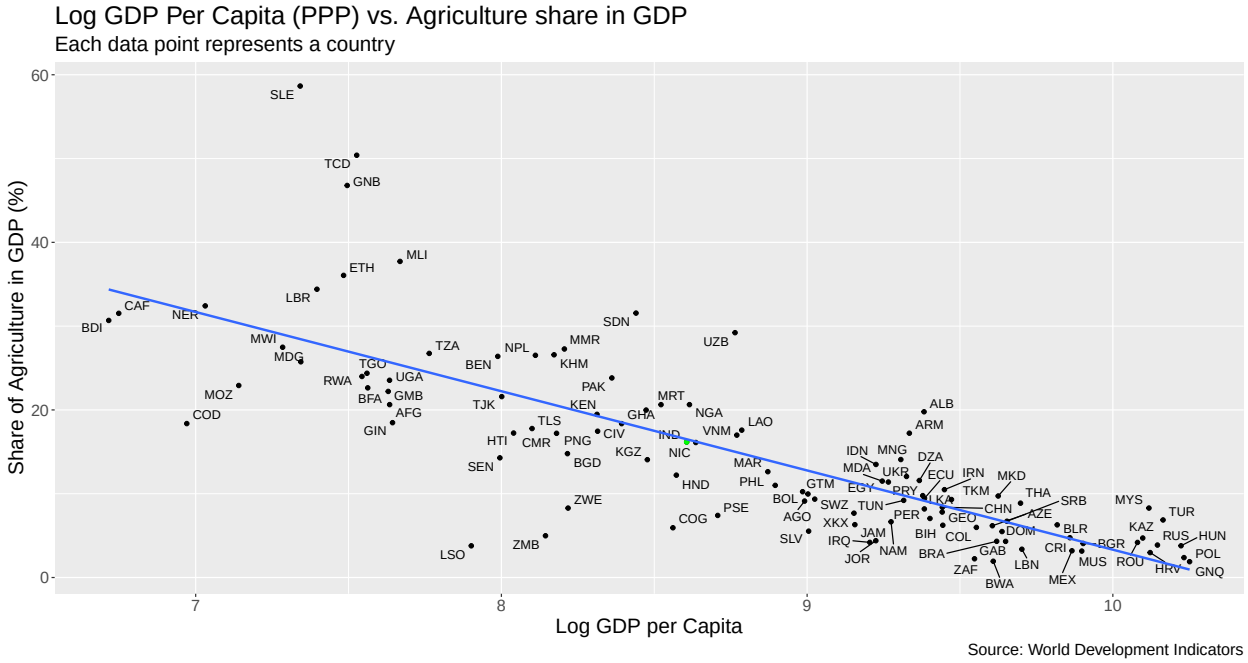
STRUCTURAL CHANGE

Q1. A cross country scatter plot of the share of agriculture in GDP vs GDP Per Capita PPP for the year 2015



Q2. Regress agricultural share of GDP on ln GDP per capita (PPP),limiting your sample to not tiny, not rich countries.

```
##
## Regression of Agricultural share in GDP on log GDP per capita (PPP)
## ====================================================
##                              Dependent variable:
##                          ---------------------------
##                          Share of Agriculture in GDP
## ----------------------------------------------------
## Log GDP Per Capita (PPP)           -9.455***
##                                     (0.729)
##
## Constant                           97.872***
```

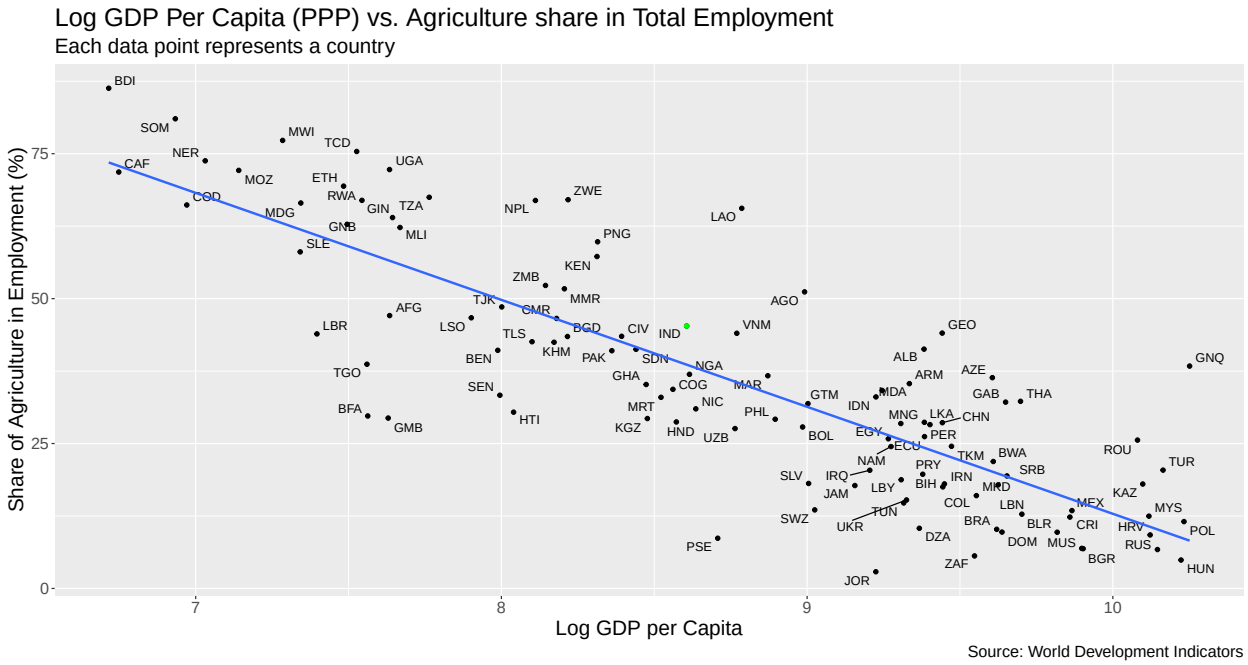
```
##                                    (6.431)
##
## ------------------------------------------------
## Observations                         106
## R2                                  0.618
## Adjusted R2                         0.614
## Residual Std. Error           6.860 (df = 104)
## F Statistic                168.127*** (df = 1; 104)
## ================================================
## Note:                    *p<0.1; **p<0.05; ***p<0.01
```

Interpretation of the regression coeffecient: Since it is a linear-log model, the regression coefficient is statistically significant and can be interpreted as 1% increase in Log Per capita GDP (PPP) is associated with (9.45/100=0.945%) decrease in share of agriculture in GDP. Alternatively, we can predict that if the GDP doubles, i.e an increase of 100% then the share of agriculture in GDP would decrease by 9.45 percentage points.

Q3. Ans. The regression line is already there in the Q1 figure. India is marked with green dot. It is on the line.

Q4. Repeating Q1-3 for share of agriculture in employment

4.1



4.2

```
##
## Regression of Agricultural share in total employment on log GDP per capita (PPP)
## ================================================================
##                                  Dependent variable:
##                              ---------------------------
##                              Share of Agriculture in Total Employment
```

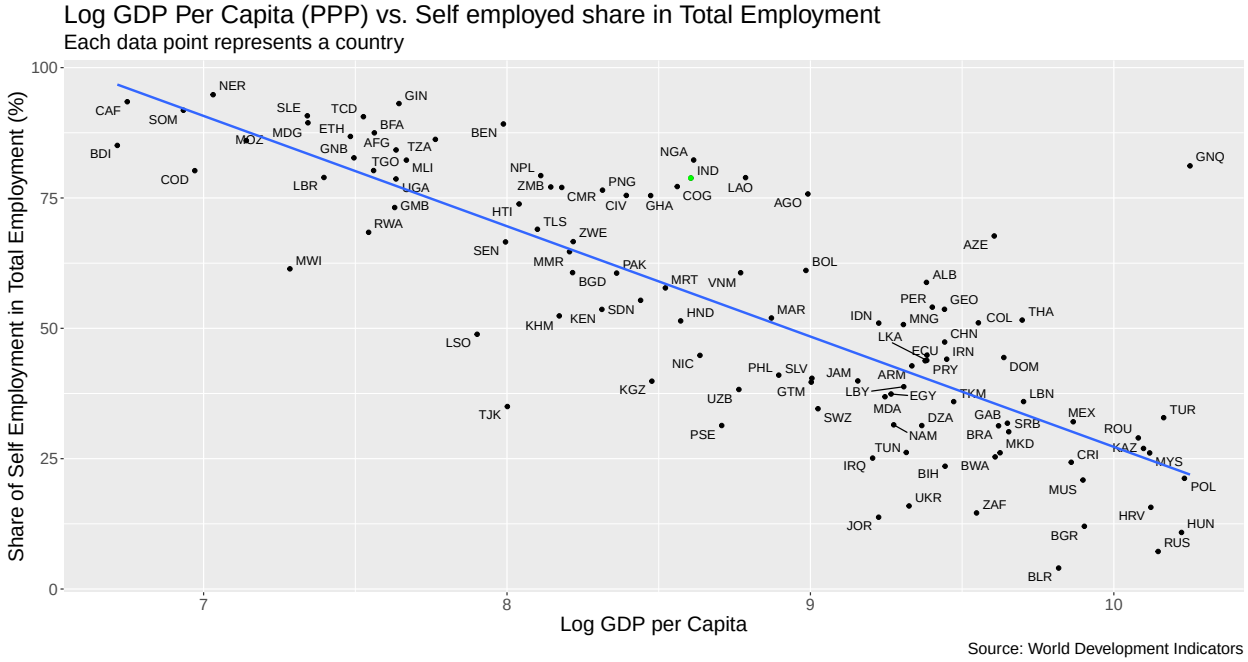
```
## ------------------------------------------------------------------
## Log GDP Per Capita (PPP)                -18.453***
##                                          (1.208)
##
## Constant                                197.410***
##                                          (10.638)
##
## ------------------------------------------------------------------
## Observations                               107
## R2                                        0.690
## Adjusted R2                               0.687
## Residual Std. Error                  11.588 (df = 105)
## F Statistic                       233.253*** (df = 1; 105)
## ==================================================================
## Note:                                  *p<0.1; **p<0.05; ***p<0.01
```

Interpretation of the regression coefficient: Since it is a linear-log model, the regression coefficient is statistically significant and can be interpreted as 1% increase in Log Per capita GDP (PPP) is associated with $(18.45/100 = 0.1845\%)$ decrease in share of agriculture in total employment. Alternatively, we can predict that if the GDP doubles, i.e an increase of 100% the number of workers in agriculture (share of agriculture in total employment) would decrease by 18.45%. Thus, we can say for every 100 worker, there would be 18.45 percentage points lesser worker engaged in agriculture.

4.3 Ans. The Scatter plot in 1 already has a regression line, India is seen a bit above the line.

Cross sectional relationship between self-employment share in total employment and GDP per capita

1. A cross-country scatter plot of the share of self-employment in total employment vs GDP per capita in PPP terms for the year 2015.



Source: World Development Indicators

2. Regress self-employment share on ln GDP per capita (PPP), limiting sample to not tiny,not rich countries.

```
##
## Regression of Self Employment share in total employment on log GDP per capita (PPP)
## ===================================================================
##                                      Dependent variable:
##                          -------------------------------------------
##                          Share of Self Employment in Total Employment
## -------------------------------------------------------------------
## Log GDP Per Capita (PPP)                   -0.212***
##                                             (0.015)
##
## Constant                                    2.388***
##                                             (0.131)
##
## -------------------------------------------------------------------
## Observations                                  107
## R2                                           0.657
## Adjusted R2                                  0.654
## Residual Std. Error                     0.143 (df = 105)
## F Statistic                        201.037*** (df = 1; 105)
## ===================================================================
## Note:                                  *p<0.1; **p<0.05; ***p<0.01
```

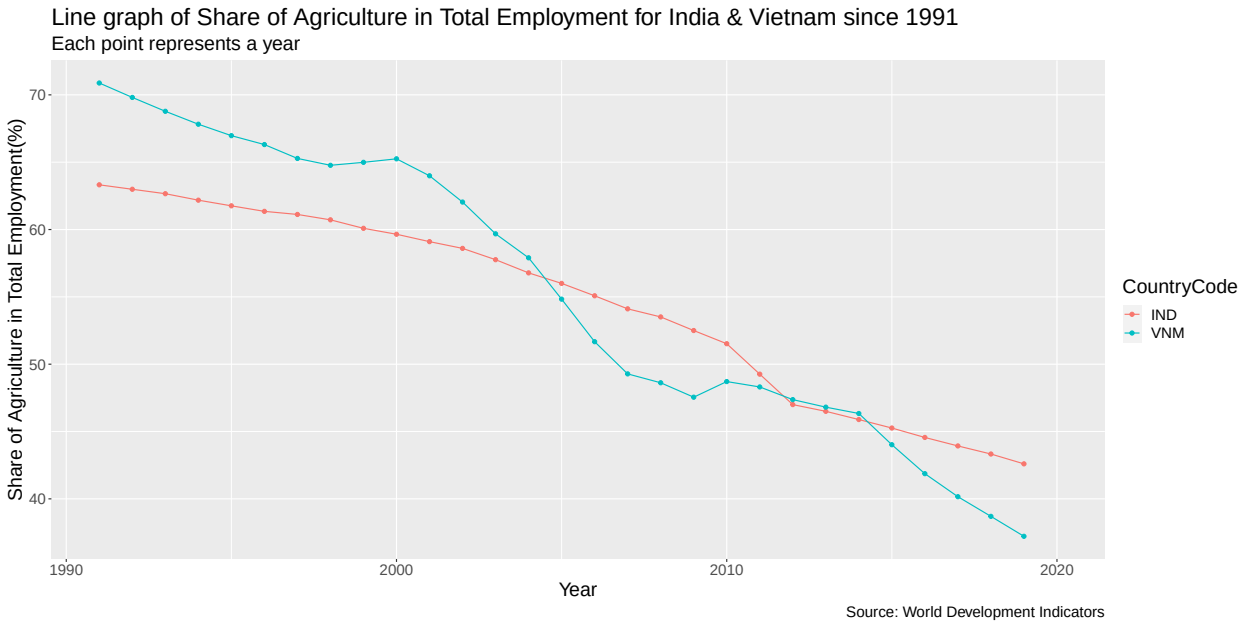
Interpretation of the regression coefficient: Since it is a linear-log model, the regression coefficient is statistically significant and can be interpreted as 1% increase in Log Per capita GDP (PPP) is associated with (0.212/100=0.00212%) decrease in share of self employment in total employment. Alternatively, we can predict that if the GDP doubles, i.e an increase of 100% then the number of workers self employed workers (Share of self employment in Total employment) would decrease by 2.12 percentage points. Thus, we can say for every 100 worker, there would be 2.12 lesser worker engaged in self employment.

3. Regression line is already fit in the scatter plot above using 'geom_smooth()' function. India is marked with green dot and found much higher above the regression line.

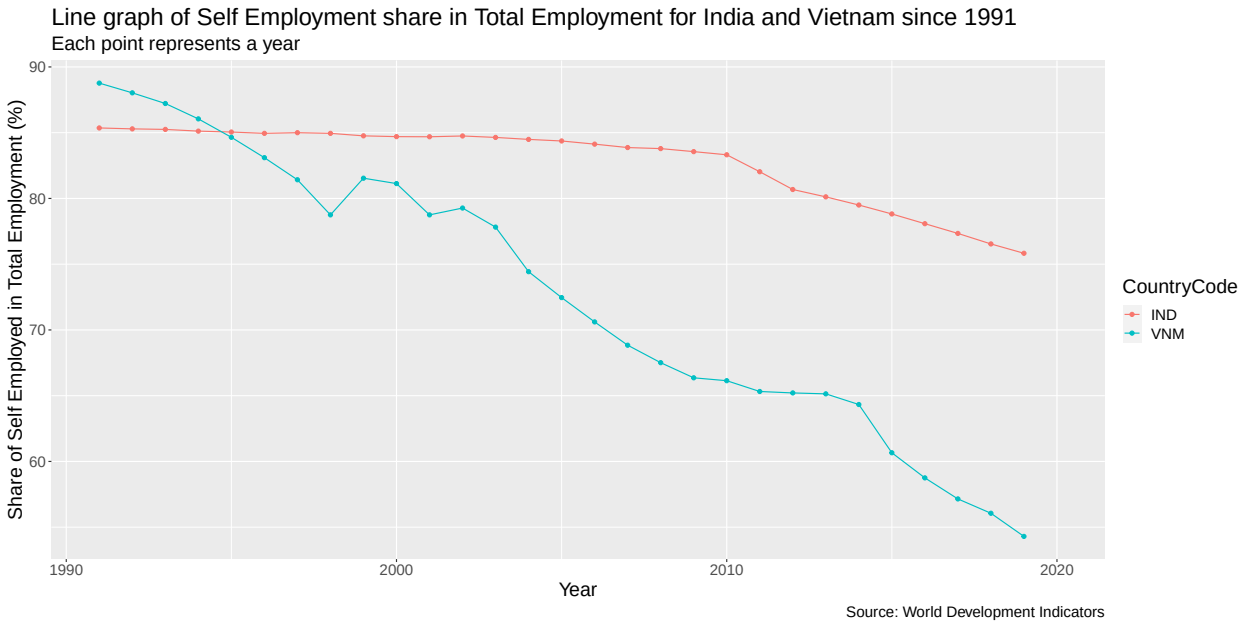
What difference do you notice with respect to India's location in the self-employed (se) share graph versus the one you made for agriculture's share in employment versus the one for agriculture share in GDP? Reflect on your finding? India lies on the regression line in the agriculture share graph, it means that India is following the global trend of agricultural share in composition in GDP given it's per capita income (in log). In the graph of agriculture's share in employment, India is slightly above the line. Indicating that more workers are employed in agriculture in India than India's counterpart with almost same level of Log GDP per capita. However, when it comes to share of self employment in total employment, India lies markedly above the line. These trends shows that the nature of structural transformation is such that although the share of Agriculture in employment has fallen but not as much as GDP share. In addition to this, the high self employment share in employment tells us that the workers coming out of the agriculture sector have moved to the self employment sector. India has a large informal economy with a substantial workforce engaged in se.

Changes in agri and self-employment shares over time for selected countries.

Q1. A line graph of agri share of employment over time (since 1991) for India and Vietnam

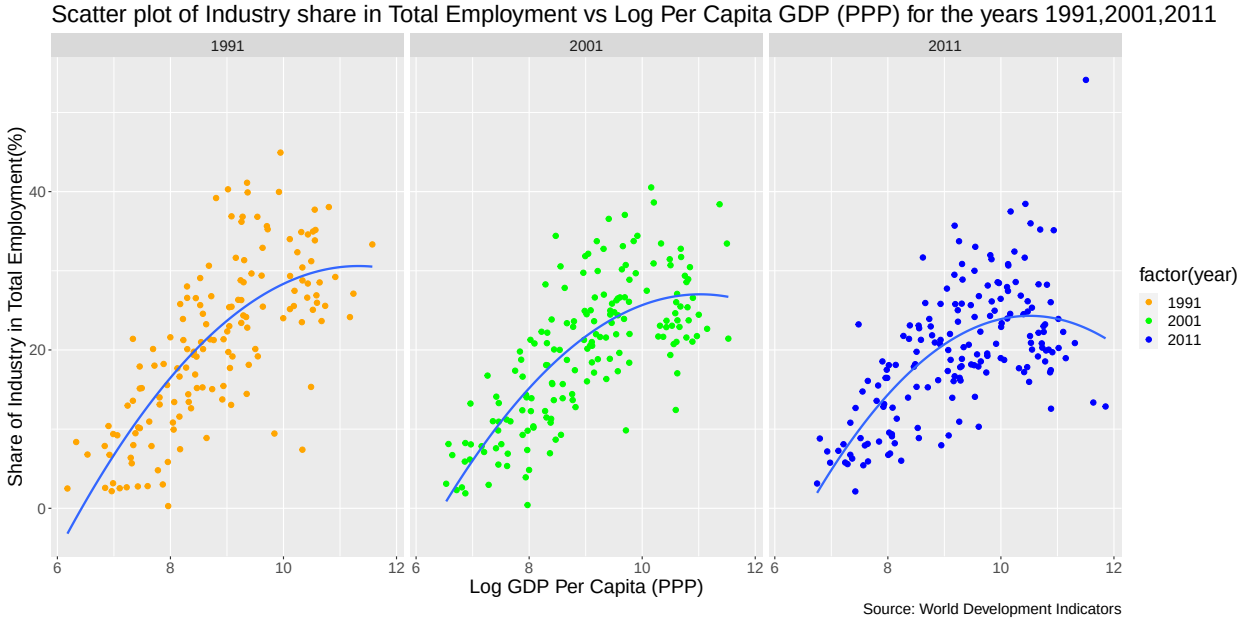


Q2. A line graph of self-employment share of employment over time (since 1991) for India and Vietnam.

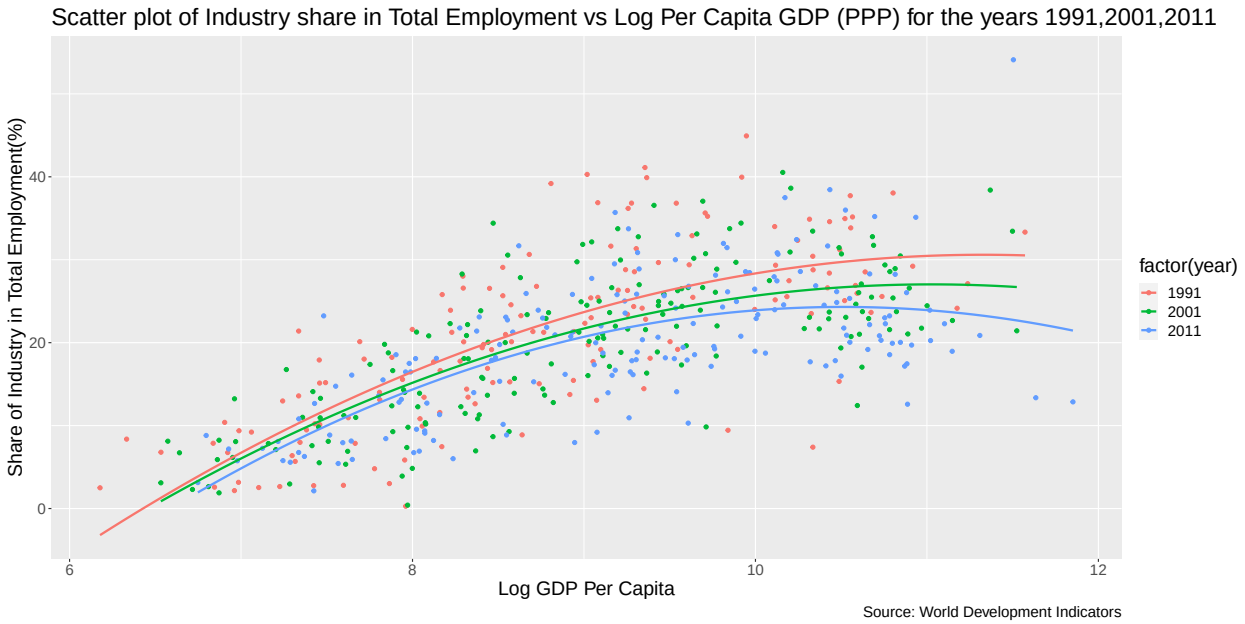


Q3. The time trends for the two variables differ in one key respect. What is that? Can you link what you observe here to your reflections in the previous question? India's share of agriculture as well as self employment (se) was lower than vietnam in 1991. However, over the years, both countries experience fall in agri. share. India's decline was lesser than Vietnam and interestingly by 2019 India is ahead of Vietnam in the same. The striking observation in in se, se share has fallen significantly for Vietnam. It is almost stagnant upto 2010 for India, and even in post 2010, the decline is marginal. The link with the previous question is that it confirms our assertion that workers in India move from Agriculture to se, which has kept se share stagnant. This explains the large size of India's informal economy with an abundance of small firms.

PREMATURE INDUSTRIALISATION



Combing all the years together in one plot like Figure IV of Amirapu & Subramanian (p.10)



Observation: The line is a bit like Inverted-U, it means that the relationship between Industrial share in employment with Log GDP Per Capita (PPP) is such that the share of industry in employment increases as an economy progress and it gets richer the upto a peak point and it falls beyond that point. There is a striking downward trend in the scatterplots above. The curve is shifting downward from 1991 to 2011. The peak share of Industry in Employment falling from 30% in 1991 to 27% in 2001 to 24 % in 2011. It tells us that, over the years at any level of GDP per capita, lesser proportion of people are employed in Industrial sector.

The peak is also shifting leftwards, it means that the countries are attaining the peak in lesser GDP per capita. This phenomenon is called premature deindustrialisation. The concept is that if industrialisation is the driver of growth most of the countries have been deindustrialised even without getting richer. As far as India is concerned, It has been above the regression line in all the years. This means that the percentage share of Industry in total employment in India is higher than its counterparts of the same level of Per Capita GDP (log). There is also an increasing trend. The share has increased from 15%, 17%, & 23%.