Ex 2: Correlations

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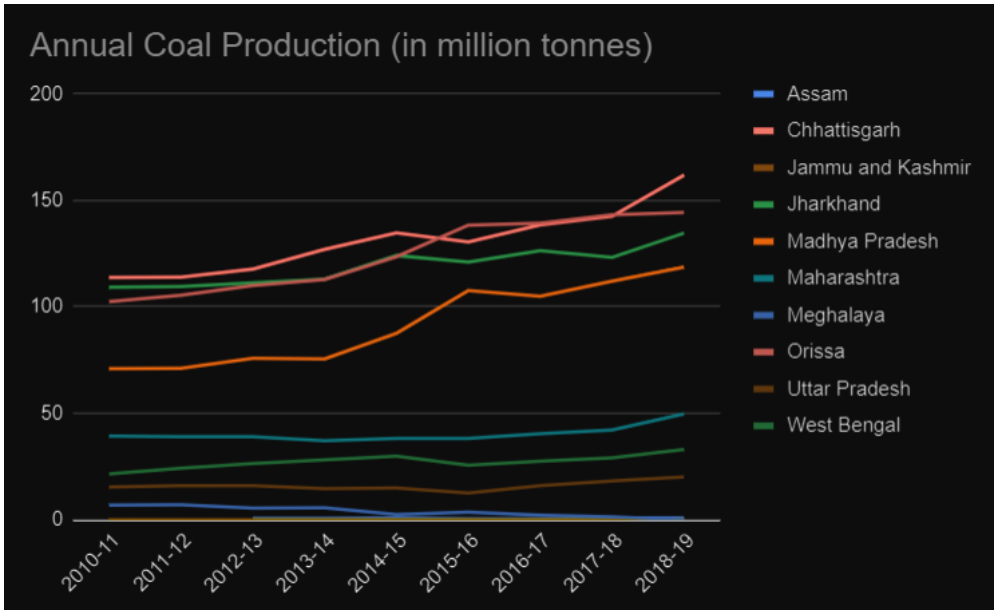
Analysis:

According to the United Nations Development Programme(UNDP), HDI or Human Development Index is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. I calculated the correlation between annual HDIs and the annual coal productions of 10 states of India, namely

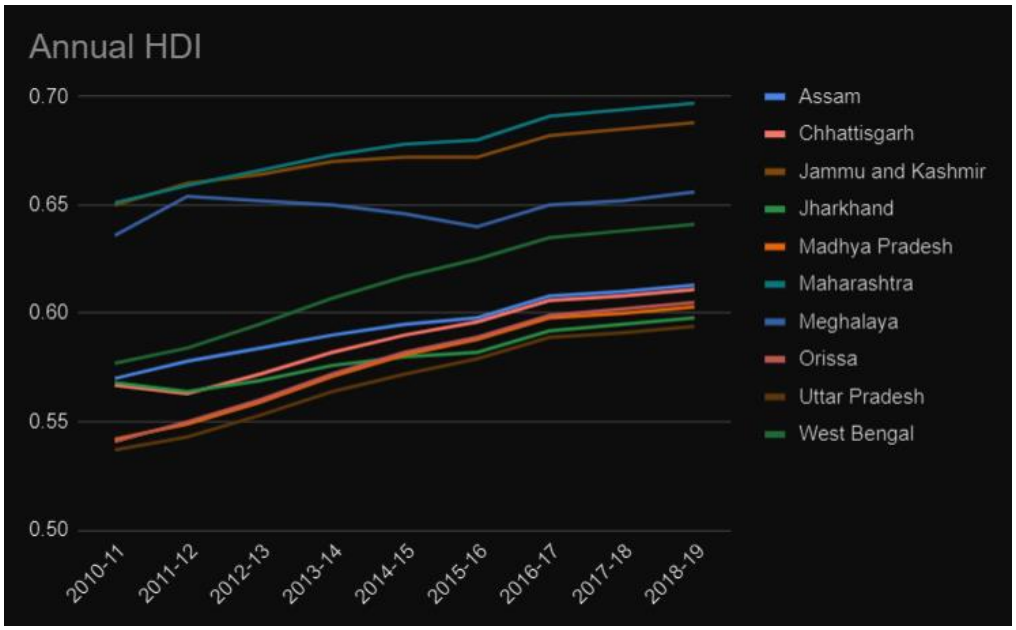
- Assam
- Chattisgarh
- Jammu and Kashmir
- Jharkhand
- Madhya Pradesh
- Maharashtra
- Meghalaya
- Orissa
- Uttar Pradesh
- West Bengal

The states have been chosen from all over India in a way so as to accommodate as many factors possible.

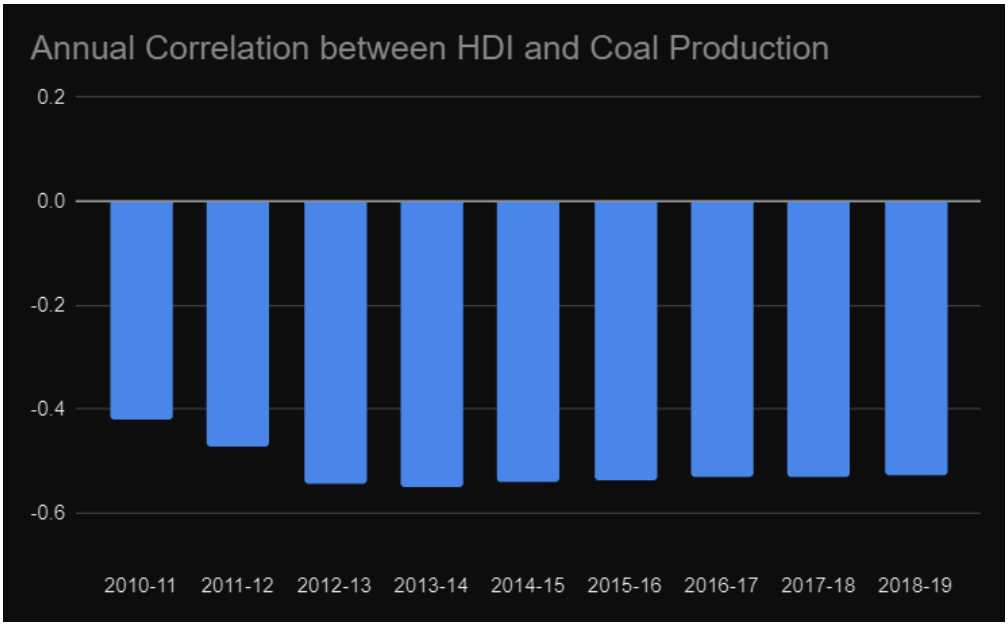
I noted down the appropriate data for coal productions of the states (attached with this document) and plotted it graphically.



I then did the same for the HDIs of the states.



I then calculated the correlation between the two factors and got the set of data for each of the years (attached to this document), which I also plotted graphically.



We see an almost consistent correlation ranging between -0.6 and -0.4 (while it can range from -1 to 1). This thus helps me conclude that the annual coal production in states all across the nation is moderately negatively correlated to their annual HDIs.

As I analyse this, I realise that this data we received as output makes perfect sense for a few reasons.

Firstly, mass coal production does seem to have quite a few advantages. Coal production in an area not only brings in a lot of revenue but also provides employment to local people. India even exports around a million metric tonnes of coal annually to neighbouring nations. These could help to play a part in boosting the HDI of that state. Also, the production of coal aids accessibility to energy which thus boosts the standard of living.

However, the adverse impacts of coal production and mining on the HDI far outweigh these positives. It seems to be a positive that coal production implies a huge influx of money but we have to understand that it goes directly to the government, and not the community there. If it was agrarian land instead of mining land, the resources would have led to direct income of the people there, whose lives depend on it. The argument of local employment is very feeble here too since, compared to the case of an agrarian land, local labourers are paid very low wages

though they put in the same effort, if not more. Unlike other cases, the land used in coal mining or other activities of this sort does not belong to the people and is not under their control, so that does make a huge difference. This analysis also goes hand in hand with the resource curse theory which describes how countries rich in mineral resources are unable to use that wealth to boost their economies and rather, counter-intuitively, they have lower economic growth than countries without such abundance of natural resources.

Now, to address the elephant in the room. A major factor affecting HDI is health and longevity. It is not unknown knowledge that the adverse effects of coal on health is almost a never-ending list. I will break this particular into two parts. Firstly, air pollution due to coal mining and other processes involved in its production claims around 1 lakh lives prematurely every single year just in India. I personally hail from Asansol, a place which has some primary coal mines. Almost the entirety of the population here suffers from diseases like chronic asthma. It does not take much effort to connect the dots. Secondly, what is the point of providing local employment involving coal production when the average lifespan of workers in the coal production industry is around 50. Considering one of the most important factors of HDI is longevity and health, this is crystal clear logic justifying the negative correlation between HDI and coal production. Also, these workers' tasks involve excruciating tasks including things like carrying extremely heavy loads and working for long durations in mines with inhumanely low oxygen content.

Also, although child labour is officially illegal in India, it is a known secret that thousands and lakhs of children are employed for low wages to work in industries like the coal industry because their small frame can prove advantageous; around 70,000 children are estimated to be working in coal mines if we just consider the Jaintia Hills. So, the number of child coal production workers in India is tragically enormous. This obviously implies that these children do not get an opportunity to get educated but education is a key factor in the HDI.

So, although high coal production does aid certain factors of the HDI, the negatives outweigh them by a huge margin, which therefore provides us

with a consistent moderately negative correlation between statewise coal production and HDI ranging near and around -0.5.

Sources for data:

- https://globaldatalab.org/shdi/shdi/IND/?levels=4&interpolation=1&extrapolation=0&nearest_real=0
- http://coalcontroller.gov.in/writereaddata/files/download/provisionalcoalstat/ProvisionalCoalStatistics2019-20.pdf

Reference:

- https://www.airclim.org/
- https://economictimes.indiatimes.com/
- https://www.csmonitor.com/
- https://www.worldmets.com/
- https://en.wikipedia.org/wiki/Resource_curse

Link for all the data files used, the code and the output received by computation:

https://iiitaphyd-my.sharepoint.com/:f:/g/personal/arghya_roy_research_iiit_ac_in/EtDUL6v8hllEm9wXfs3iPqABWSXUiR98EXSrBUIN9ixg9g?e=jc1VZC

[Please note that these files are also attached with the submission.]