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Education Gini in Higher Education

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Abstract
The Gini coefficient gives single statistic, which summarizes the dispersion. India's education system is grossly affected by gross inequalities in access, completion and quality. Category, linguistic background, gender, ethnicity have impact on the educational experience in India. These leads to inequalities in knowledge. It is being attempted to find the relation between Gini coefficients of education, educational variables, and growth. Higher education is a bit complex and overlapping on the time of attainments in different levels of higher education. Complex structure of higher education considering overlaps have been considered and Gini coefficients have been calculated. The Education Gini for India is 0.1389. It is interesting to note that with respect to Education Gini for Jammu and Kashmir, Uttarakhand, Delhi are greater disparity in terms of attainments of higher education levels compared to other states. Lorenz curve has been drawn for West Bengal as sample.

Keywords*: Education-inequality, Education Gini, Gini coefficient, rank, rank correlation*

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I. Introduction

The population of India in 2020 was 1.39 billion people. 50% could not be graduated. More than 20 million Indian children did not even have a chance to enter kindergarten. It shows is inequality in India's education system. Currently, there's still no surveys to reveal exactly how many more students in the country have fallen out of school during the COVID-19 pandemic. About 14.4% urban women are illiterate. The gap of literacy rates by gender is huge, but also the highest level of education by area. The ratio of university graduates was down to just 5.7%, compared to 21.7% in urban areas. For the country, only 16.6% graduated, while 10.6% completed a university degree. Those who were not literate at all is 26.1% of the population.

The Senses Intelligent Interactive Panel(SIIP) stated that one core problem is that a lot of Indian youths would never be qualified to go to university more likely to opt for a diploma/degree to work abroad for a better income. Thus India's method of academic evaluation encourages disparity. The habit to nurture "geniuses" from colonized India has become a great wall cutting a large number of students off access to higher education.

The Gini coefficient gives single statistic, which summarizes the dispersion of income across the entire income distribution. The Gini coefficient ranges from 0 to 1. The Gini is based on the difference between the Lorenz curve (the observed cumulative income distribution) and the notion of a perfectly equal income distribution.

Unequal educational outcomes are attributed to several variables, including family of origin, gender, and social class. Achievement, earnings, health status, and political participation.

India's education system is grossly affected by gross inequalities in access, completion and quality. Category, linguistic background, gender, ethnicity have impact on the educational experience in India. These leads to inequalities in knowledge.

The ratio of university graduates was down to just 5.7%, compared to 21.7% in urban areas. The public spending on education have a long term impact on social inequality through social mobility, boosting earnings and opportunities. Achievement, earnings, health status, and political participation also contribute to educational inequality. Education is reasonably one of the primary factors that affects income inequality. The earnings gap between workers with a Bachelor's or more advanced degree and workers with a high school diploma is increasing.

It also happened that the students from economically weaker families are more likely to attend schools with lesser infrastructure, fewer qualified teachers, less ambitious peers and outdated pedagogical practices. They are more likely to end up with lower learning outcomes as compared to effluent families.

Education being a fundamental capability attribute is considered as a vital instrument shaping the social and economic development of a nation. It is argued that the education enriches people's understanding of themselves and the world. It improves the quality of individual lives and generates broad social benefits to

individuals and society at large. Education raises peoples' productivity, provide better employment opportunity and earnings.

Education plays a key role in changing this state of affairs and is responsible for the development of both personality and the creation of ideas that changes attitudes, actions and perspectives to guide through life and shaping the future. Essentially, power relations, discrimination and the guarantee of equality are defined through education. Education should therefore develop scientific, cultural, social and personal skills that help increase young people's self-confidence, enhance their capacities, capabilities to improve their social and political participation. This is clear from birth: little girls are dressed in pink –the colour of tenderness – while little boys are dressed in blue – the colour of intelligence.

Good education has considerable power to increase equality between women and men. Education can help tackle gender disparities in wages, poverty, reproductive autonomy and political power. It can dramatically improve the health outcomes for women and their children.

Inadequate education leads to large public and social costs in the form of lower income and poor economic growth, reduced tax revenues, and higher costs of health care, social security, and increased crime. Educational equity is the study and achievement of fairness, justice, and impartiality (equality) in education.

Educational inequality is the unequal distribution of academic resources, including but not limited to funding, qualified and experienced teachers, books, and technologies to socially excluded communities. In addition to academic performance, attainment of learning objectives, acquisition of desired skills and competencies, satisfaction, persistence, and post-college performance should all be measured and accounted for when determining the educational success of individuals. In 2018, rural areas had a literacy rate of 73.5%, as compared to the urban literacy rate of 87.7 per cent. In the 2011 census, Scheduled Castes had an average literacy rate of 66.1 per cent with an all-India literacy rate of 73 per cent. Under the National Education Policy 2020, marginalized gender identities, socio-cultural identities, geographical identities, disabilities, and socioeconomic conditions have been grouped under Socio-Economically Disadvantaged Groups (SEDGs). Specific provisions have been recommended for SEDGs including targeted scholarships, conditional cash transfers to parents, and providing bicycles for transportation.

It is being attempted to find the relation between Gini coefficients of education, educational variables, and growth. This will be achieved by reductions in gender gaps, higher enrolment rates, and lower dropout rates, lower pupil-teacher ratios and higher public expenditure on education. There are no simple one-way causalities. Policies enhancing savings ratios and enrolment in tertiary education have the largest effects through the whole system. Gini coefficient of education or education Gini is being calculated for higher education in similarity that of Gini coefficients of school attainments. Higher education is a bit complex and overlapping on the time of attainments in different levels of higher education. On simple/linear time durations Gini coefficients have been calculated on the way. On the other hand, complex structure of higher education considering overlaps have been considered and Gini coefficients have been calculated.

DATA

All India Survey o Higher Education (AISHE) has been considered as main source for data. The data of level-wise enrolment are collected from AISHE reports for the year 2020-21 of the major states in India. The states considered are Andhra Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Tripura, Uttarakhand, Uttar Pradesh and West Bengal.

II. Method & Result

In cycle of levels of attainment in higher education are not always mutually exclusive and exhaustive in any sense. After 10+2 level of schooling, all programmes with at least 2 years of duration have been considered here. The levels are under-graduate, diploma, certificate, integrated, post graduate, post graduate diploma, M.Phil and Ph.D. The individual may take any programme along and after any programme/s. Diploma, Certificate and under-graduate have been called as degree; integrated and post graduate diploma and post graduate as post degree; M.Phil and Ph.D as higher degree as levels of attainment.

The education Gini formula used in this paper is :

$$EG = \frac{1}{\mu}\sum_{i=2}^{n}\sum_{j=1}^{i-1} p_i |y_i - y_j| p_j \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where, EG is the education Gini based on educational attainment distribution, large population;

μ is the average years of attainment for the concerned population;

p_i and p_j stand for the proportions of population with certain levels of attainment;

y_i and y_j are the years of attainment at different educational attainment levels;

n is the number of levels/categories in attainment data.

Barro and Lee (1991) divided the population into seven categories including no-schooling (or igiterate), partial primary, complete primary, partial secondary, complete secondary, partial tertiary, and complete tertiary. The seven groups are both mutually exclusive and collectively inclusive for the concerned population.

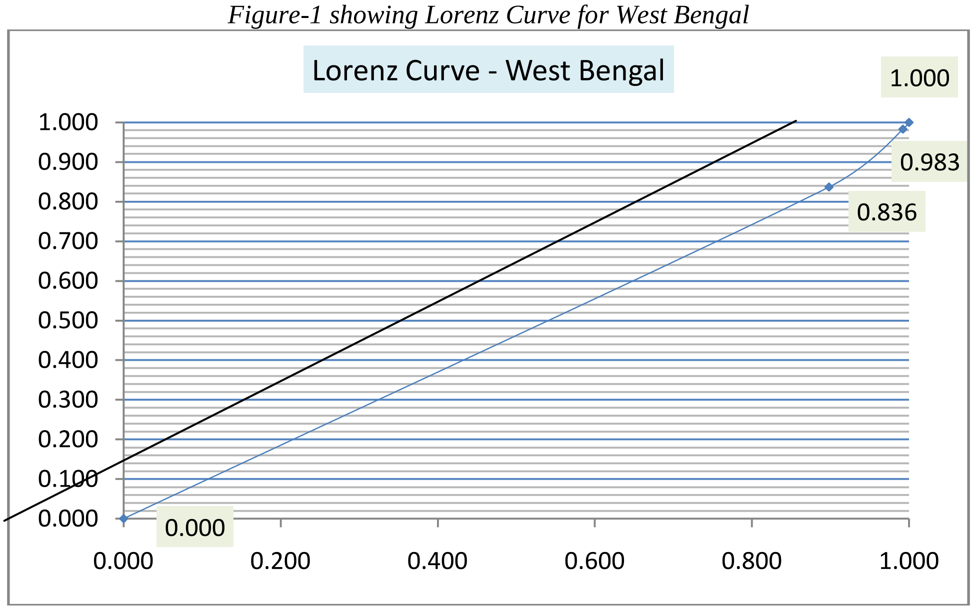
EG = $(1/\mu)$ [$p_2(y_2-y_1)p_1+p_3(y_3-y_1)p_1+p_3(y_3-y_2)p_2$] …………. ………….. ……. (2)
Where, p_i is the proportion of population with ith level of attainment,
y_i is years of attaining for an individual with ith level of attainment,
The formula for calculating the years of attaining at the ith levels of education:
$y_1 = c_1$, $y_2 = c_1+c_2$, $y_3 = c_1+c_2+c_3$ ……………. ………………….. ……. (3)
Where, c_1 is the cycle of the under-graduate education; c_2 is the cycle of the post graduate education; and c_3 is the cycle of the M.Phil and/or Ph.D+ education.
μ(Mean) = AYA(average years of attainment) = $\sum_{i=1}^{n} p_i y_i$ ……………… ……….. (4)
Plot of (Q,S) will give us Lorenz curve.
$Q_1 = p_1$, $S_1 = y_1p_1/\mu$; $Q_2=p_1+p_2$, $S_2=(y_1p_1+y_2p_2)/\mu$; $Q_3=p_1+p_2+p_3$, $S_3=(y_1p_1+y_2p_2+y_3p_3)/\mu$ …. .. (5)

Table -1 showing Education Gini for 2020-2021 for major states in India

State	EG1(Education Gini with non-overlapping attainments)	EG2(Education Gini with overlapping attainments)	State	EG1(Education Gini with non-overlapping attainments)	EG2(Education Gini with overlapping attainments)
Andhra Pradesh	0.117	0.123	Kerala	0.143	0.150
Assam	0.128	0.122	Madhya Pradesh	0.153	0.156
Bihar	0.093	0.097	Maharashtra	0.136	0.149
Chhattisgarh	0.161	0.156	Odisha	0.124	0.133
Delhi	0.172	0.173	Punjab	0.159	0.165
Goa	0.156	0.159	Rajasthan	0.152	0.134
Gujarat	0.134	0.142	Tamil Nadu	0.157	0.169
Haryana	0.146	0.153	Telangana	0.144	0.152
Himachal Pradesh	0.132	0.131	Tripura	0.152	0.154
Jammu and Kashmir	0.181	0.188	Uttar Pradesh	0.126	0.123
Jharkhand	0.142	0.152	Uttarakhand	0.180	0.193
Karnataka	0.135	0.146	West Bengal	0.113	0.114

The figures for India are 0.1389 and 0.1429 respectively. It is interesting to note that with respect to EG1- Jammu and Kashmir, Uttarakhand, Delhi are the states with greater disparity in terms of attainments of higher education levels.

Figure-1 showing Lorenz Curve for West Bengal



The Lorenz curves may be obtained by plotting (Q,S) as stated in (5).

REMARKS

The study of disparity in attaining the higher education may be measured by Education Gini. It has not yet been attempted at national level also. The complexity of higher education attainments are very complex and not have any clear-cut policy on the progression for attaining different levels of higher education. It makes difficult to measure the Education Gini for higher education. This attempt is on a very simplified assumption alike to school education. The more detailed study may be a further clear measure of disparity in higher education attainment.

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