

Secondary and Higher Secondary Education Inequality in Bangladesh

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Abstract

Education and economic growth have an important relationship. Former education inequality studies found that between groups inequality was lower than within group inequality. This paper aims to investigate the both within group and between groups inequality and interpret inequality among schools and colleges with their performance. This study measures education inequality through analysis of Secondary School Certificate and Higher Secondary Certificate examination results of Bangladesh through Theil index. Analysis shows that inequality among schools at different board decreases over the year. Inequality among colleges shows non-uniform pattern. It is also found that urban areas have higher inequality than rural areas. However, inequality in urban-rural is declining, but the inequality gap between them is mounting.

Keywords: Education inequality, Theil index, inequality within group, inequality between groups, inequality gap.

Introduction

Educational inequality is the difference in the learning results, or efficiency, experienced by students coming from different groups. Educational efficiency is most often measured by grades, GPA scores, test scores, dropout rates, college entrance statistics, and college completion rates. From the different studies it has been seen that there is an important relationship education and economic growth (Hanushek and Wobmann (2010); Hawkes and Ugur (2012); Delgado et al. (2014)). Education helps individuals in developing necessary skills and mental capacity by enriching knowledge, in return helps their productivity. As education is important for economic growth, in the recent years many researches were carried out to reveal the distribution of education. Education inequality is one of them. Gini coefficient is one of the popular inequality measures. One important difficulty of the Gini coefficient is that it is not easily decomposable.

Theil index can decompose inequality into between and within group components easily, the use of this index is increasing day by day. This study has employed the Theil index in computing education inequality to investigate between and within group inequality. Nevertheless, without awareness of average performance, knowledge of education inequality alone may not be sufficiently informative. Therefore, in this study, interpretation is carried out by combining education inequality and average performance.

Bangladesh is a developing country and its education rate is growing in recent years (BBS 2016). But to comprehend the reality this study focuses on decomposing the inequality. In its most general form, decomposability of inequality measures needs a consistent relation between overall inequality and its parts. More specifically, when doing decomposability, within inequality (W) and between inequalities (B) is to be distinguished. The within inequality captures the variation of education within the group, whereas the between inequalities capture the variation of education across different groups. For example, if the population is divided in urban and rural individuals, the W element identifies the contribution to inequality due the variability of urban and rural education taken separately. The B element, instead, identifies the inequality due to education differences between groups. So both the measures are important to understand the existing education inequality. To understand the inequality of education between and within groups, decomposing is an important analytical tool. It can provide us true picture of education inequality in different groups.

Ferdaush (2011) examines the inequality in primary education of Bangladesh for different reasons. In case of rural and urban areas, inequality in the percentage of dropout rate of children was found high. The percentage of dropped children in rural areas has decreased from 10.1 percent in 2000 to 5.86 percent in 2010 with an average reduction rate of 0.42 percent per annum. However, in urban areas, this percentage has increased from 9.5 percent in 2000 to 10.39 percent in 2010 with an average increasing rate of 0.09 percent per annum. Al-Samarrai (2009) examines the reason behind education inequality because of governance. The paper he has demonstrated that despite being a central goal of government policy, public education expenditure has not prioritized the poor. The paper also has shown that the link between government education policy objectives and budget allocations are weak. During the interpretation of inequality decompositions, within-groups inequality is often found to be higher than between-group (Elbers et al. (2008)). This condition has led some studies to focus on within group inequality. In an empirical study done by Akita et al. (1999) promoted them to recommend policy makers to focus more on within province inequality. The main objectives of the study are to present the current scenario of pass and GPA-5 over the year in Secondary School Certificate (SSC) and Higher Secondary Certificate (HSC); and to find out the education inequality in different boards and urban-rural areas of Bangladesh.

Methodology

This study utilizes information from Bangladesh public examination i.e. the Secondary School Certificate (SSC) and the Higher Secondary Certificate (HSC) examination results for 7 years from 2009 to 2015, as obtained from the Bangladesh Bureau of Educational Information & Statistics (BANBEIS 2016). Data for the analysis are drawn from 8 education boards (regions) of Bangladesh, those are: (i) Barisal board (ii) Chittagong board (iii) Comilla board (iv) Dhaka board (v) Dinajpur board (vi) Jessore board (vii) Rajshahi board and (viii) Sylhet board for 7 years from 2009 to 2015. The number of institutes that are taken for the analysis is given below by boards for different years.

Table 1: Number of institutes taken for analysis

	SSC						
	2009	2010	2011	2012	2013	2014	2015
Barisal Board	1277	1607	1259	1264	1295	1324	1341
Chittagong Board	906	917	920	938	954	962	975
Comilla Board	1532	1539	1547	1568	1595	1616	1645
Dhaka Board	3735	3765	3881	3991	4078	4131	4205
Dinajpur Board	2324	2333	2351	2394	2455	2509	2550
Jessore Board	2346	2369	2386	2412	2411	2436	2467
Rajshahi Board	2351	2355	2375	2432	2457	2542	2589
Sylhet Board	703	717	727	740	765	785	812
Total	15174	15602	15446	15739	16010	16305	16584

	HSC						
	2009	2010	2011	2012	2013	2014	2015
Barisal Board	244	246	245	254	263	272	300
Chittagong Board	173	179	185	188	193	202	214
Comilla Board	279	279	287	295	300	310	323
Dhaka Board	744	775	825	866	906	959	1027
Dinajpur Board	475	473	480	493	514	540	583
Jessore Board	482	488	493	489	513	528	549
Rajshahi Board	632	628	631	638	645	661	692
Sylhet Board	131	132	142	159	164	203	232
Total	3160	3200	3288	3382	3498	3675	3920

The variables used for the analysis are: Year, Total number of students appeared in the examination, Total number of students passed in the examination, Total number of students got GPA-5 in the examination, Percentage of students passed in the examination, Name of the education board of the institute, Location of the institute (Urban or Rural), Point value and Category.

Table 2: Classification of pass rate and their respective points (BANBEIS 2016)

Classification	Pass(%)	Point Value
Excellent	90-100	10
	80-90	9
	70-80	8
Good	60-70	7
	50-60	6
	40-50	5
	30-40	4
Poor	20-30	3
	10-20	2
	0-10	1

The Theil index (Akita et al. 1999) is a statistic used to measure inequality. It is a special case of generalized entropy index. Theil index ranges from 0 (perfect equality) to 1 (perfect inequality). If all individuals are achieving the similar score, Theil index equals to zero. Otherwise, if only one individual is achieved maximum marks while the rest of them had zero mark, Theil index would be 1. Education inequality was estimated by using Theil index:

$$\sum_i^n \sum_j^{N_i} \left(\frac{P_{ij}}{P_i} \right) \ln \left[\frac{\left(\frac{P_{ij}}{P_i} \right)}{\left(\frac{1}{N_i} \right)} \right]$$

Where, P_{ij} is the point value for individual j , group i ; n represents number of interested groups; N_i is the group size of i^{th} group and P_i is the total point value of individuals in the group i .

Their index can be easily decomposed into 'between-group' and 'within-group' components. The decomposition is as follows:

$$T = \sum_i^n \left(\frac{P_i}{P} \right) T_i + \sum_i^n \left(\frac{P_i}{P} \right) \ln \left[\frac{\left(\frac{P_i}{P} \right)}{\left(\frac{N_i}{N} \right)} \right] = T_W + T_B$$

Where, $T_i = \sum_j^{N_i} \left(\frac{P_{ij}}{P_i} \right) \ln \left[\frac{\left(\frac{P_{ij}}{P_i} \right)}{\left(\frac{1}{N_i} \right)} \right]$, N is the total sample size, P is the total point, and n is the number of interested groups. T_W and T_B are within and between decomposition components respectively.

Analysis and Results

From the analysis in table 3, it is found that the percentage of pass in SSC examination was increasing from 2009 to 2014, whereas it decreases in 2015. There was a decrease in the percentage of GPA-5 from 2011 to 2012 and an increase from 2012 to 2014 and again it decreased in 2015. The variation in performance of the schools was decreasing from 2009 to 2014, while it increased in 2015.

Table 3: Percentage of schools students of SSC examination score

	SSC						
	2009	2010	2011	2012	2013	2014	2015
Excellent	41.54	56.95	62.83	75.05	84.28	91.36	76.24
Good	54.44	42.05	36.81	24.76	15.60	8.57	23.26
Poor	4.02	1.00	0.36	0.19	0.12	0.07	0.50
Total(%)	100	100	100	100	100	100	100
Variance	4.70	2.34	1.59	1.19	0.93	0.58	1.57
Pass(%)	67.40	78.36	82.36	86.20	89.60	92.62	86.68
GPA 5(%)			7.75	7.22	8.74	12.14	9.75

The education inequality have decreased in SSC examination from 2009 to 2014 and suddenly increased in 2015, as shown in table 4. Decreasing education inequality is a good sign but the increase in it may be a concern. In addition, the within boards and between boards inequalities are also decreasing, while there was an increase in 2015. The between boards inequality is too low, that lead us to investigate the inequality within boards.

Table 4: Inequality decomposition by boards in Bangladesh of SSC examination

	Theil index						
	2009	2010	2011	2012	2013	2014	2015
Total Bangladesh	0.0446	0.0184	0.0114	0.0079	0.0059	0.0035	0.0108
Between Boards	0.0014	0.0006	0.0003	0.0002	0.0003	0.0001	0.0005
Within Boards	0.0432	0.0178	0.0111	0.0077	0.0056	0.0034	0.0103

Table 5 illustrates that the pass rate in HSC Examination increased from 2009 to 2012 and decreased in 2013 and again increased in 2014, but again decreased in 2015 by almost 10%, which is the lowest pass rate in last 7 years. The variance shows that when pass rate increases, variation decreased among the colleges.

Table 5: Percentage of colleges students of HSC examination score

	HSC						
	2009	2010	2011	2012	2013	2014	2015
Excellent	39.97	44.19	46.50	51.60	44.37	51.46	40.15
Good	56.71	54.19	50.88	46.95	53.06	45.99	50.74
Poor	3.32	1.62	2.62	1.45	2.57	2.55	9.11
Total(%)	100	100	100	100	100	100	100
Variance	4.20	3.08	3.56	2.69	3.55	3.36	5.95
Pass(%)	70.43	71.85	72.34	76.34	71.00	75.82	65.94
GPA 5(%)			7.66	9.03	8.08	8.34	6.02

The education inequality have decreased in HSC Examination from 2009 to 2012 and increased from 2012 to 2015 and highly increased in 2015, as shown in table 6. Increasing education inequality is not a good sign. In addition, the within boards and between boards inequality also increased. The between boards inequality is low

in respect of within boards, that lead us to investigate the inequality within boards.

Table 6: Inequality decomposition by boards in Bangladesh of HSC examination

	Theil Index						
	2009	2010	2011	2012	2013	2014	2015
Total Bangladesh	0.0377	0.0266	0.0314	0.0223	0.0321	0.0295	0.0635
Between Boards	0.0029	0.0003	0.0011	0.0011	0.0011	0.0028	0.0084
Within Boards	0.0377	0.0266	0.0314	0.0223	0.0321	0.0295	0.0635

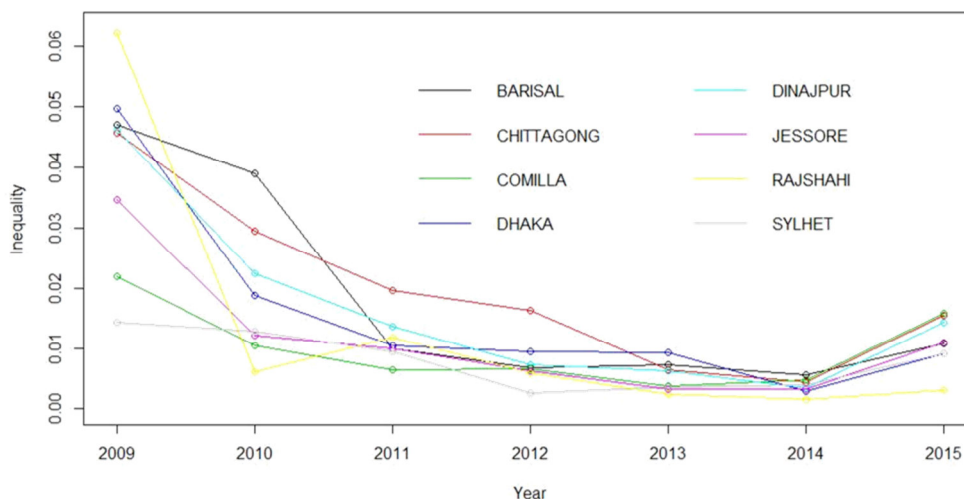


Figure 1: Inequality in SSC Examination in different boards

In figure 1, it is depicted that in 2009, there was different inequalities among the boards, but over the year the inequality was decreased and in 2014, the inequality became almost same for all the boards. In 2015, the inequality was increased for all boards, without Rajshahi board, as the pass rate was decreased for all boards in that year. Rajshahi board had the maximum inequality in 2009, but, in 2015 Rajshahi board had the minimum inequality, which is a good achievement for the Rajshahi education board.

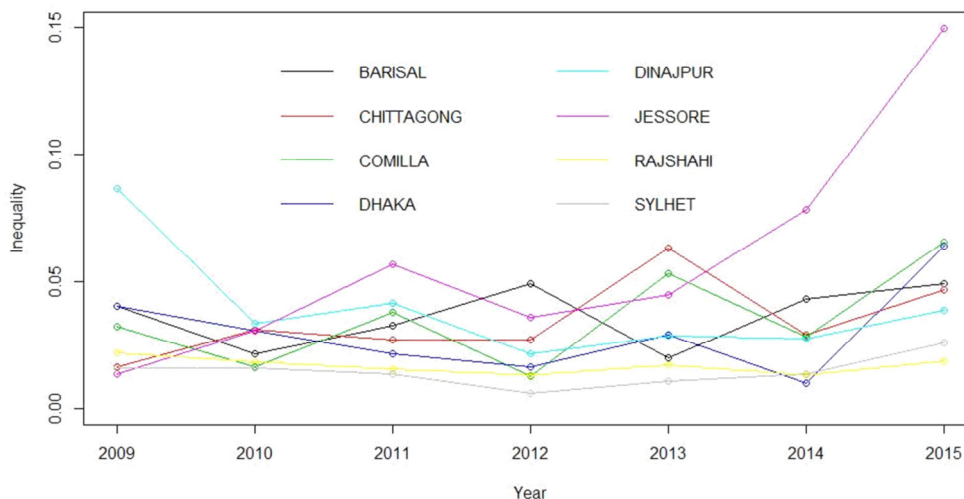


Figure 2: Inequality in HSC examination in Different boards

Figure 2 shows that for some boards, inequality decreases over the year and for some increases over the year. In 2009, Jessore board has the minimum inequality, while in 2015, Jessore board has the maximum inequality. It a great matter of concern for Jessore education board that over the year inequality among colleges increasing very highly. And Rajshahi board has the low inequality over the years, which is good sign for them.

Table 7: Percentage of schools students by urban-rural classification of SSC examination

Urban							
	2009	2010	2011	2012	2013	2014	2015
Excellent	51.59	63.60	72.10	80.74	88.80	93.94	82.16
Good	45.97	35.31	27.58	19.06	11.19	6.01	17.42
Poor	2.44	1.09	0.33	0.20	0.01	0.06	0.42
Total(%)	100	100	100	100	100	100	100
Variance	4.02	2.34	1.45	1.07	0.68	0.44	1.22
Pass(%)	74.74	82.13	86.93	89.35	92.32	94.70	90.45
GPA 5(%)			15.67	15.48	17.64	23.12	19.08

Rural							
	2009	2010	2011	2012	2013	2014	2015
Excellent	38.5	54.97	60.23	73.46	83.03	90.65	74.61
Good	57.0	44.06	39.40	26.35	16.81	9.28	24.87
Poor	4.5	0.97	0.36	0.19	0.16	0.08	0.52
Total(%)	100	100	100	100	100	100	100
Variance	4.83	2.33	1.61	1.21	0.99	0.61	1.65
Pass(%)	63.43	76.43	80.13	84.67	88.22	91.59	84.83
GPA 5(%)			3.56	2.97	4.04	6.50	4.86

The urban area has higher pass rate than rural area illustrated in table 7. On the other hand, GPA-5 rate also about 5 times higher in urban area than rural area. But, for both areas over the year pass rate is increasing and variation among them decreasing, which is a good sign for the education.

Table 8: Inequality decomposition by boards in urban-rural areas of SSC examination

Theil Index							
	2009	2010	2011	2012	2013	2014	2015
Urban							
Total	0.0344	0.0183	0.0099	0.0069	0.0041	0.0025	0.0080
Between Boards	0.0008	0.0006	0.0004	0.0002	0.0002	0.0001	0.0004
Within Boards	0.0336	0.0177	0.0095	0.0067	0.0039	0.0024	0.0076
Rural							
Total	0.0472	0.0183	0.0117	0.0081	0.0064	0.0037	0.0115
Between Boards	0.0018	0.0008	0.0004	0.0003	0.0004	0.0001	0.0006
Within Boards	0.0454	0.0175	0.0113	0.0078	0.0060	0.0036	0.0109

From the analysis, it was found that inequality was decreased from 2009 to 2014 and increased in 2015 in urban areas. Meanwhile between group and within group inequality was also decreased over the years in urban areas. Between groups inequality is very low in respect of within group inequality in urban areas. Inequality was decreased from 2009 to 2014 and increased in 2015 in rural areas. Between groups inequality is very low in respect of within group inequality in rural areas. Within group and between group both inequality was decreased for rural areas over the years.

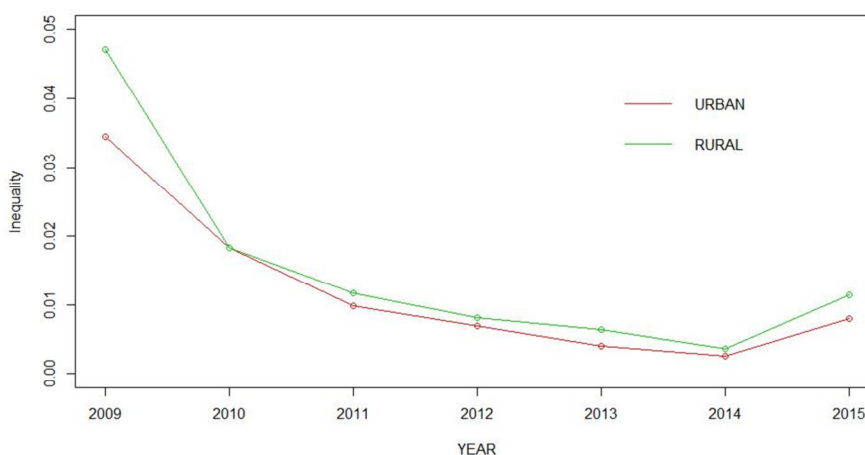


Figure 3: Inequality in SSC examination by urban-rural areas

From the figure 3, it can be seen that inequality was decreased from 2009 to 2014 and increased in 2015 for both urban and rural areas. Figure 4 shows that inequality gap between urban-rural areas is decreased from 2009

to 2010, but during 2010 to 2014 inequality gap is being increased between urban-rural areas again in 2015 inequality gap begins to rise.

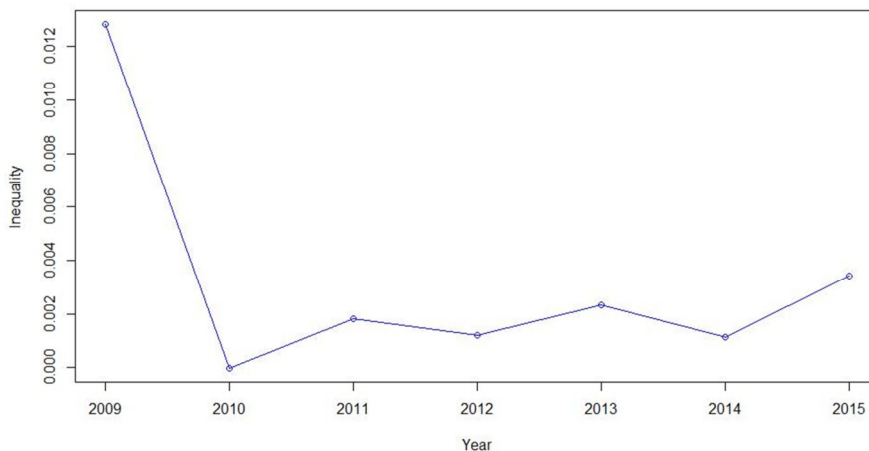


Figure 4: Inequality gap between urban-rural areas in SSC examination

From the analysis it is found that urban area has higher pass rate than rural area. On the other hand, GPA-5 rate also about 5 times higher in urban area than rural area. But, for both areas pass rate was increased from 2009 to 2012 and decreased in 2013 and 2015, as shown in table 9, increase in pass rate is a good sign for the education.

Table 9: Percentage of college students in urban-rural areas of HSC examination

	Urban						
	2009	2010	2011	2012	2013	2014	2015
Excellent	43.12	46.35	48.24	55.03	48.30	56.21	41.62
Good	54.42	52.49	50.26	43.84	49.82	42.11	50.66
Poor	2.46	1.16	1.50	1.13	1.88	1.68	7.72
Total(%)	100	100	100	100	100	100	100
Variance	3.74	2.96	3.17	2.51	3.40	3.05	5.62
Pass(%)	71.47	73.12	73.73	77.77	72.22	77.76	68.17
GPA 5(%)			9.83	11.74	10.65	11.20	8.34
	Rural						
	2009	2010	2011	2012	2013	2014	2015
Excellent	37.38	42.35	44.97	48.55	40.86	47.26	38.89
Good	58.58	55.63	51.43	49.72	55.95	49.41	50.81
Poor	4.03	2.02	3.60	1.73	3.19	3.33	10.30
Total(%)	100	100	100	100	100	100	100
Variance	4.21	3.17	3.88	2.83	3.64	3.58	6.2
Pass(%)	68.23	69.29	69.49	73.65	68.80	72.40	62.02
GPA 5(%)			2.95	3.64	3.18	2.94	1.55

From the analysis it was found that there is many ups and downs in inequality in urban area. From 2009 to 2010 inequality was decreased and from 2010 to 2011, inequality was almost same for urban area, as shown in table 10. But in 2015 inequality was increased very highly.

Table 10: Inequality decomposition by boards in urban-rural areas of HSC examination

	Theil Index						
	2009	2010	2011	2012	2013	2014	2015
	Urban						
Total	0.0334	0.0247	0.0263	0.0201	0.0293	0.0252	0.0576
Between Boards	0.0026	0.0003	0.0017	0.0014	0.0016	0.0030	0.0080
Within Boards	0.0308	0.0244	0.0246	0.0187	0.0277	0.0222	0.0496
	Rural						
Total	0.0411	0.0281	0.0357	0.0242	0.0343	0.0330	0.0685
Between Boards	0.0037	0.0005	0.0007	0.0009	0.0010	0.0034	0.0095
Within Boards	0.0374	0.0276	0.0350	0.0233	0.0333	0.0304	0.0590

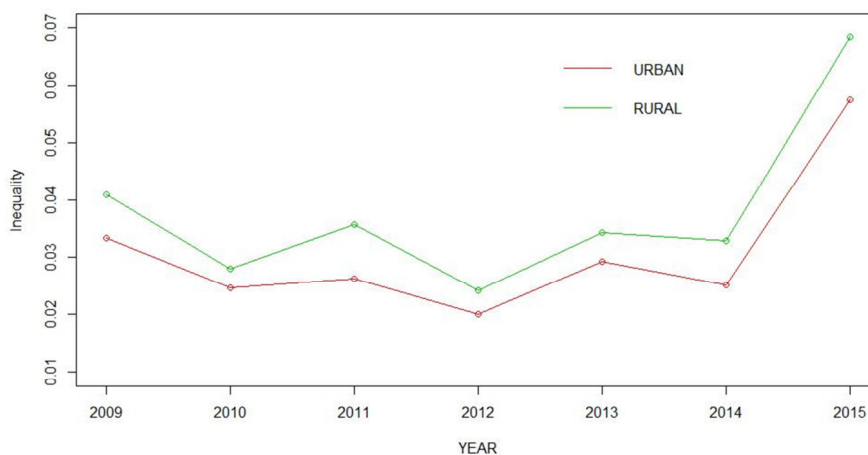


Figure 5: Inequality in HSC examination by urban-rural areas

From the Figure 5, it can be seen that from 2009 to 2012 inequality was decreased for both urban and rural areas and from 2012 to 2015 inequality was increased and highly increased in 2015 as pass rate was in-creased in 2009 to 2012 and decreased in 2013 and highly decreased in 2015 both areas urban and rural.

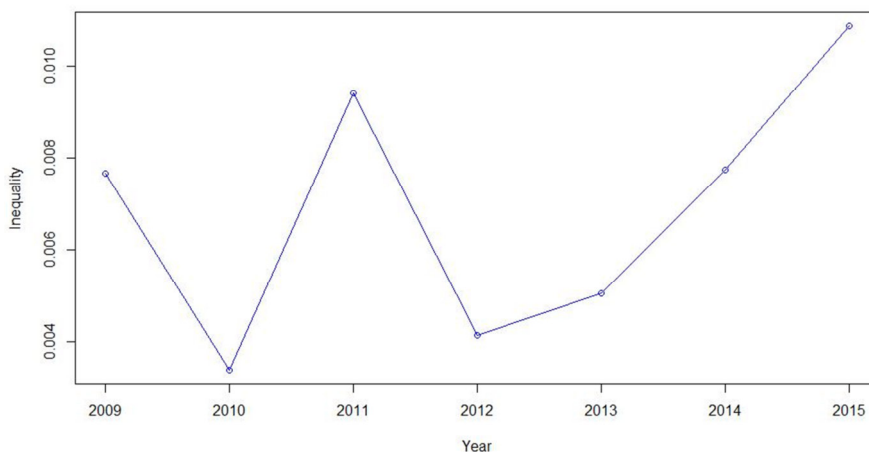


Figure 6: Inequality Gap between Urban-Rural in HSC Examination

From the Figure 6, it can be seen that pass rate gap between Urban-Rural was increased from 2009 to 2011 and decreased from 2011 to 2013 and again increased highly from 2013 to 2015. While, there is ups and downs in inequality gaps between urban-rural from 2009 to 2012 and from 2012 to 2015, inequality gap increased was increased very highly, which is not a good sign.

Conclusion

The study in Bangladesh from 2009 to 2015 shows that education inequality in SSC examination in decreasing over the years and increased in 2015 while pass rate increased in 2009 to 2014 and decreased in 2015, but in HSC examination inequality was increased from 2009 to 2015 and pass rate decreased. In SSC examination decreasing inequality is a good sign but in HSC examination increasing inequality is matter of concern for the country. Among the different boards Rajshahi board achieved a good achievement in decreasing education inequality over the year for both SSC and HSC examination. But, in HSC examination, Jessore board had a bad record as over the inequality in colleges increased over the years very highly. So, for Jessore education board it is a matter of great concern. So, action might be taken on Jessore board to decrease the inequality.

The study also shows that, education inequality in rural areas is always higher than in urban areas for both schools and colleges. This indicates that the higher the proportion of rural schools or colleges in area, the higher its education inequality tends to be. Although, for both areas, in SSC examination education inequality decreased over the time, but the gap between urban and rural areas schools are increasing over years. Again, in HSC examination, for both areas education inequality is increasing and the gap between them also increasing. Again, urban areas have almost 5 times higher percentage of GPA-5 than rural areas in both SSC and HSC examination. So, actions should be taken to narrow or close the gap of further disparity between students from urban and rural areas. So, policy makers may peep into the issues of inequality to improve the quality of education in

Bangladesh, especially in rural areas. The study is done on the basis of percentage of pass of schools and colleges, but individual students result can give a better result for the education inequality. Again, if the data are available, the study between boys and girls may also give a better result of education inequality by gender.

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