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Tan, S.C.; Ho, C.M.; Pang, V.

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Why Has Education Inequality Widened in Sabah, Malaysia?

Sui Chin Tan
Universiti Malaysia Sabah

Chong Mun Ho
Universiti Malaysia Sabah

Vincent Pang
Universiti Malaysia Sabah

Abstract

Past education inequality studies found that within-groups inequality was higher than that of between-groups. This situation has resulted in neglect of the effect of between-groups inequality which shows the disparity among groups. This paper aims to investigate both within- and between-group inequality, besides interpreting education inequality among individuals. Based on a case study in Sabah, Malaysia, this study measures education inequality through analysis of standard public examination results via the Theil index. Results show that education inequality in urban areas tends to be lesser than in rural areas, with students in the former showing better results in their examinations. It is noted that the overall level of education inequality as well as inequality for urban and rural areas in Sabah decreased between 2009 and 2013. The irony, however, is that although the education inequality in these two locales was lesser, the inequality among groups has begun to diverge.

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Contact: Sui Chin Tan - suichintan@gmail.com, Chong Mun Ho - cmho@ums.edu.my, Vincent Pang - pvincent@ums.edu.my.
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1. Introduction

Education and economic growth have long been viewed as having an important relationship (Hanushek and Wobmann, 2010; Hawkes and Ugur, 2012; Delgado, Henderson and Parmeter; 2014). Education helps individuals in developing necessary skills and expanding mental capacity, in return helps increasing their productivity. These would lead to the growth of individual income. In recent years, there has been a great deal of research carried out to uncover the distribution of education. Education inequality is one of them. Inequality measurement that is popularly used is called Gini coefficient. One advantage of Gini inequality is that it can directly compare two populations, without considering their sizes, making it widely used in inequality measurement. In terms of education inequality, there is growing literature using Gini in education inequality (Thomas, Wang and Fan, 2001; 2002). One major drawback of the Gini index is that it is not decomposable.

This study has employed the Theil index in computing education inequality, as it could be decomposed into between- and within-group components. Recent studies in economics have used this feature to decompose income inequality into groups (Kanbur and Zhuang, 2013; Segala, Akita and Yusuf, 2014).

During the interpretation of inequality decompositions, within-groups inequality is often found to be higher than between-group (Elbers, Lanjouw, Mistiaen, and Ozler, 2008). This condition has led some studies to focus on within-group inequality. In an empirical study done by Akita, Lukman and Yamada (1999), the between-province inequality in Indonesia accounted for only 17-18% of the total inequality in early 1990s. This small percentage accounting for between-group inequality has promoted them to recommend policy makers to focus more on within-province inequality, rather than between them. A similar conclusion was reached by Agrawal (2014) for a case study in India. In fact, relatively smaller share of between–group inequality does not mean that it is less important than inequalities within such groups (Kanbur, 2000). Between-group inequality reflects the social stability and racial harmony, which would break down once the average differences between groups go beyond a certain threshold. To avoid this situation, gaps among groups have to be minimized and more converged. To reach a convergence state, poorer groups need to grow faster than richer groups.

Nevertheless, without awareness of average performance, knowledge of education inequality alone may not be sufficiently informative. This is because inequality may be minimal in two conditions: either when most of the students have poor grades, or when a majority of them score good marks. Therefore, in this paper, interpretation is carried out by combining education inequality and average performance.

2 Data and Methodology

This study utilizes information from a Malaysian public examination i.e. the Malaysian Certificate of Education (SPM) mathematics results for five years from 2009 to 2013, as obtained from the Sabah State Education Department. SPM is administrated to all Year 11 students in Malaysia. The data used in this calculation does not consider boarding schools, technical schools, or religious schools, since enrollment in these institutions is pre-selected or pre-determined based on public examination results. There were 188 secondary schools considered and only the results from mathematics was included in the calculation. This is because it is a strong predictor of performance (OECD, 2013).

The SPM results were divided into four general categories and for calculation purposes, each grade was assigned with a point value as shown in Table 1. The mean grade (MG) is the average grade, which is calculated based on these points assigned as shown below:

Table 1. Classification of grades and their respective points

Classification	**Distinction**			**Credit**				**Pass**		**Fail**
Grade	A+	A	A-	B+	B	C+	C	D	E	F
Point value	10	9	8	7	6	5	4	3	2	1

Education inequality was estimated by using Theil T index:

$$\mathrm{T} = \sum_i^2 \sum_j^{N_i} \left(\frac{G_{ij}}{G_i}\right) \ln\left[\frac{\left(\frac{G_{ij}}{G_i}\right)}{\left(\frac{1}{N_i}\right)}\right]$$

where G_{ij} is the grade for individual student j, group i; 2 represents urban and rural groups; N_i is the group size and G_i is the cumulative grade of every student in the group i.

Theil inequality ranges from 0 (perfect equality) to 1 (perfect inequality). If all candidates are achieving the similar grade, Theil index equals to zero. Otherwise, if only one candidate is achieved maximum marks while the rest of them had zero mark, Theil index would be 1.

The advantage of the Theil index is that it can be decomposed easily into 'between-group' and 'within-group' components. The decomposition of Theil T is as follows:

$$T = \sum_i^n \left(\frac{G_i}{G}\right) T_i + \sum_i^n \left(\frac{G_i}{G}\right) \ln\left(\frac{{G_i}/{G}}{{N_i}/{N}}\right) = \mathrm{T_{Wit}} + \mathrm{T_{Bet}}$$

where $T_i = \sum_j^{N_i} \left(\frac{G_{ij}}{G_i}\right) \ln\left(\frac{{G_{ij}}/{G_i}}{{1}/{N_i}}\right)$. N is the sample size in urban or rural areas, G is the total grade in urban or rural areas, whereas n is the number of interested groups. $\mathrm{T_{Wit}}$ and $\mathrm{T_{Bet}}$ are between and within decomposition components, respectively.

3 Results

From the analysis, it was found that MG for rural and urban areas indicated an increase in the past five years, there was a slight improvement in the percentage of candidates who obtained distinction, credit, and passing from 2009 to 2013. There was a reduction of the percentage of candidates who failed the subject in 2013. The variance shows that the performance of students in rural areas had a narrower spread around the mean compared to those in urban areas.

Table 2. Percentage of population taken SPM across grade levels

	Urban					**Rural**				
	2009	**2010**	**2011**	**2012**	**2013**	**2009**	**2010**	**2011**	**2012**	**2013**
Observation	76	76	76	76	76	112	112	112	112	112
Grades										
Distinction	18.7	21.0	19.7	23.7	25.0	10.0	10.6	10.0	12.1	12.4
Credit	22.9	25.0	25.9	25.7	26.5	20.0	22.1	21.0	21.9	22.9
Pass	34.0	32.6	34.7	31.7	32.4	37.2	36.7	39.0	37.4	39.2
Fail	24.4	21.4	19.8	18.9	16.0	33.0	30.6	30.0	28.5	25.6
***Total* (%)**	100	100	100	100	100	100	100	100	100	100
MG	4.0	4.2	4.2	4.5	4.7	3.1	3.3	3.2	3.4	3.5
Variance	8.5	8.9	8.4	9.3	9.2	6.1	6.4	6.1	6.9	6.7

The education inequalities for urban, rural areas and overall inequality have decreased over the past five years, as shown in Table 3. This is a good sign, as it shows that a series of policies and efforts implemented by the government has borne fruit. In addition, the within-school and between–school for urban and rural areas demonstrate reductions in inequality. This means that the gaps among schools in urban and gaps among schools in rural areas, as well as the within-school inequality for urban and rural areas, are narrowing.

Table 3. Inequality decomposition by urban-rural in Sabah, and inequality in urban, rural area decomposed for schools.

	Theil Index				
	2009	**2010**	**2011**	**2012**	**2013**
Total Sabah	0.275	0.263	0.255	0.255	0.243
Between-urban-rural	0.007	0.008	0.009	0.009	0.010
Within-urban-rural	0.268	0.255	0.246	0.246	0.233
Total Urban*	0.261	0.245	0.235	0.232	0.217
Between-school	0.052	0.043	0.044	0.041	0.040
Within-school	0.209	0.202	0.192	0.191	0.177
Total Rural**	0.277	0.267	0.262	0.265	0.247
Between-school	0.024	0.035	0.031	0.029	0.028
Within-school	0.252	0.231	0.231	0.235	0.220

*112; ** 76

Nevertheless, rural areas were found to have relatively high inequality compared to urban areas (Figure 1). This is mainly because, as seen in Table 2, the MG was higher in urban areas compared to rural areas by about 10% each year. It can also be seen that, after five years since 2009, little change was observed in the number of those obtaining distinctions and credit in the rural areas. The percentage of candidates who failed the examination in rural areas was still high, reaching 25.6% in 2013.

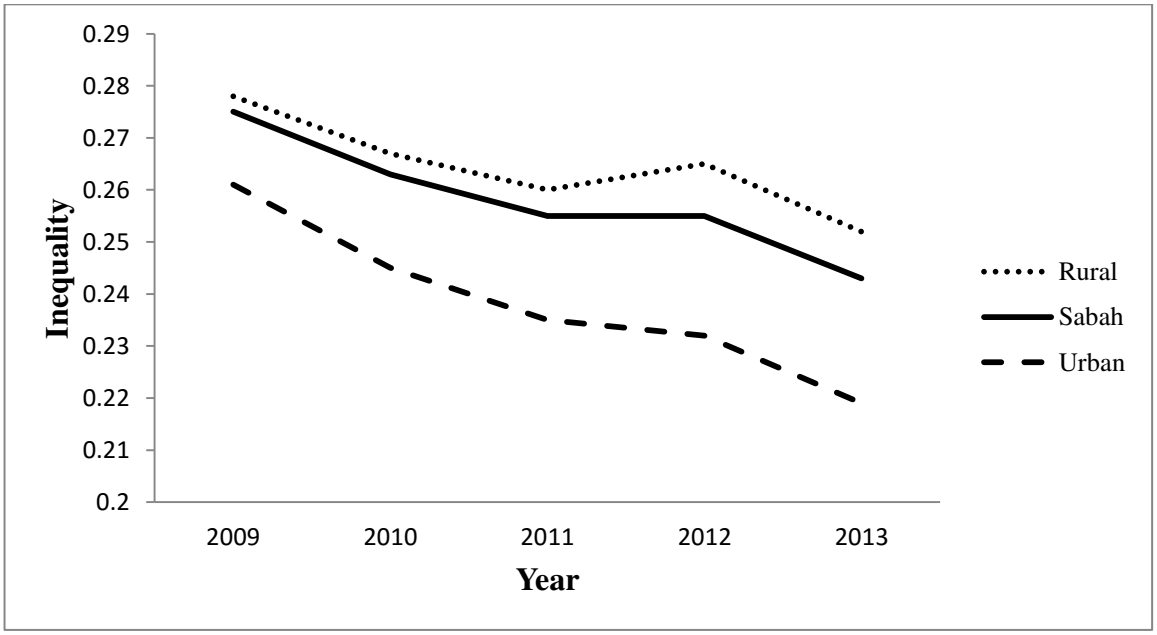

Figure 1. Education inequality in Sabah, urban and rural areas from 2009 to 2013

A possible explanation may be that in 2003, the Malaysian Government introduced the Teaching of Science and Mathematics in English (PPSMI) Policy for all primary and secondary students. In primary schools, the medium of instruction for teaching Science and Mathematics was changed from Malay, Chinese, or Tamil to English. Similarly, in secondary schools, the medium of instruction of teaching Science and Mathematics has changed to English Language. A study by Ismail (2012) indicated that students in urban areas have better proficiency in English language compared to students in rural areas. Figure 2 shows a comparison of mean grades of English Language scores between urban and rural areas. It indicates that the students in rural schools have lower proficiency in English. Therefore, students in rural areas face greater challenges than their counterparts in urban areas.

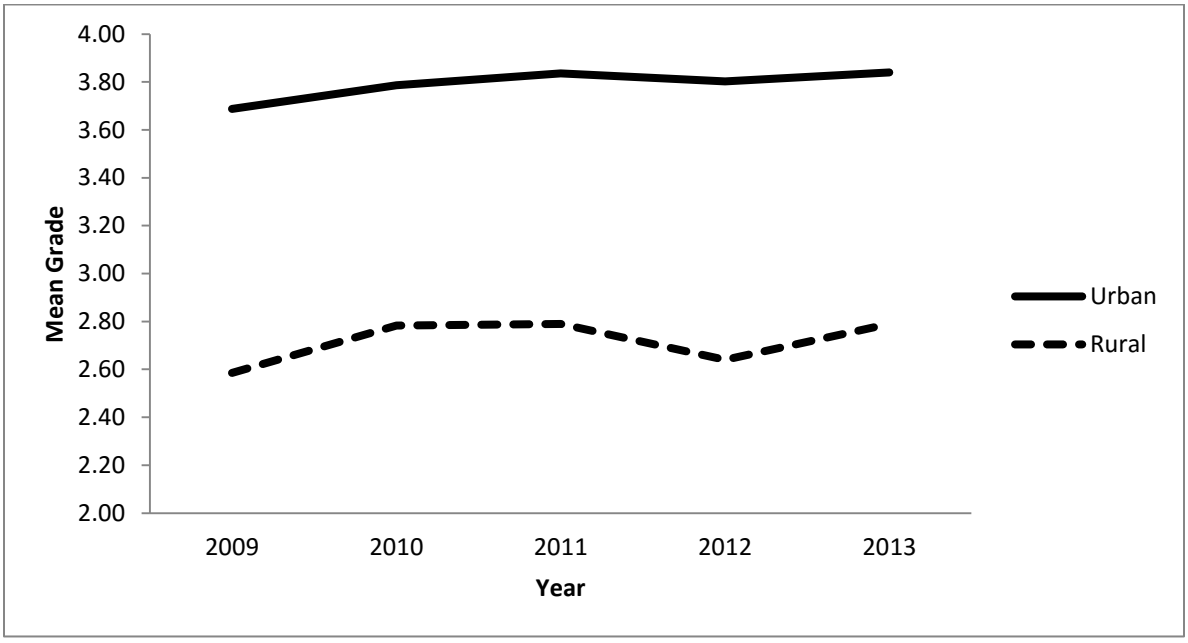

Figure 2. Examination mean grade for English Language SPM from 2009 to 2013

When considering decomposition of the Theil index into within-group and between-group inequality, the within-urban-rural inequality component has shown an improvement in performance over the years, by narrowing down the gaps within each group. However, between-urban-rural component has shown an increase of the inequality over the years. A clearer picture of this is shown in Figure 3, which implies that gap between rural and urban areas has widened. This contradicts with convergence hypothesis where the gap among groups should be narrowed. The gap may be caused by differing rates of improvement, mainly due to the implementation of PPSMI policy. As a result, students in rural areas experienced slower improvement in education, which is shown by the rise of between-school inequality from 0.024 in 2009 to 0.028 in 2013, and reaching a maximum of 0.035 in 2010. On the other hand, urban areas have shown greater improvement, where between-school inequality has exhibited a slight decline from 0.052 in 2009 to 0.040 in 2013.

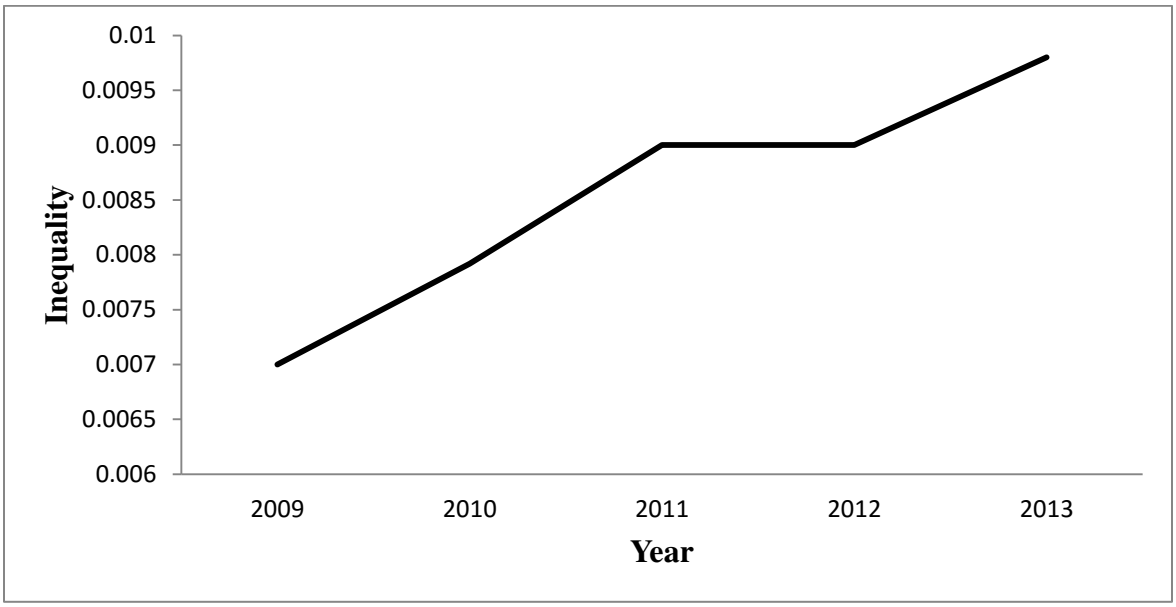

Figure 3. The increasing gaps between urban and rural areas from 2009 to 2013.

For inequality of districts, generally the number of rural schools in districts is seen to affect its education inequality. This is shown by the disparity of achievement that caused by varying percentage of rural schools in districts. Districts with more urban schools have higher MG than districts with more rural schools; thus, education inequality for more urban-school districts is lower. However, there are cases where two districts have similar low inequality, yet they are having great different of MG. One of them has better MG, while the other shows poorer performance. Therefore, consideration of MG in the interpretation of education inequality is crucial.

4 Conclusion

This article demonstrates the role played by between-group inequality in overall education inequality. The case study in Sabah from 2009 to 2013 shows that education inequality in rural areas is always higher than in urban areas. This indicates that the higher the proportion of rural schools in an area, the higher its education inequality tends to be. Although there was a reduction in the level of inequality in urban and rural areas, the study found that the gap between these two areas is still increasing due to the low improvement rate in rural schools. Within the short span that PPSMI was implemented, rural schools have higher education inequality compared to urban schools. Even though both areas have decreased in terms of education inequalities, the gap between urban and rural schools is getting bigger. The implementation of PPSMI in Malaysia has faced many obstacles and it has been announced that it will be fully abolished in 2021.

The proportion of rural schools in a district affect its education inequality. When decomposition is carried out for districts, the highest and lowest education inequalities were found in areas with a higher number of rural schools. This is why the MG is needed in the interpretation of the results. Low performing schools or districts may have lower inequality. Actions should be taken to narrow or close the gap of further disparity between students from urban and rural areas. Therefore, a cogent commitment is needed for policy makers to cohesively address these issues in improving the quality of education, especially in rural areas.

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