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Rural-Urban Education Inequality in the Philippines Using Decomposition Analysis

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Abstract

This study assesses the educational distribution in rural and urban areas—both at national and provincial levels—by employing the education Gini coefficient and decomposition analyses. The findings of the study reveal that rural and urban educational inequalities are generally improving over time as shown by the education Gini estimates for rural and urban areas. Decomposition analyses show that, at the national level, the rural-urban education inequality gap or Rural-Urban Gap is the main contributor to education inequality; in contrast, at the provincial level, the main contributor is the inequality within rural areas. This implies that educational provision should be enhanced in rural areas. The paper pays particular attention to the province of Tawi-Tawi which is the only province that experienced an increase in both rural and urban educational inequalities. Accounting for sex subgroups, modified decomposition analysis is able to ascertain that such observation is due to the dismal educational distribution of its rural population. On the other hand, the negative inequality growth contributions of its urban population could be viewed as a possible evidence of labor migration.

Keywords: *inequality contributions, rural-urban gap, Tawi-Tawi*

Introduction

Educational equality does not only mean an egalitarian state where educational attainment is equally distributed among the population. Being related to education which is a human capital component, it also means equality of opportunities as much as it serves as an engine of improvements in labor productivity. It then can be argued that economic growth is made possible by educational equality, enabling the poor households to move out of poverty and achieve a higher standard of living (Thomas Wang and Fan 2001; Ibourk and Amaghouss 2012). But if the converse scenario becomes a reality, an inequitable educational distribution would result in a situation in which opportunities accrue only to the educated elites of the society, which then permits them to hold a sizeable portion of the national income, leading to an increase in poverty incidence and a widening of the gap between the poor and the non-poor (Ibourk and Amaghouss 2012).

Equality in access to education is becoming a significant factor behind income disparities in rural and urban areas as the urban areas are frequently associated with greater access to education. Mohamed and Said (2012), who studied educational expansion and educational inequality between rural and urban areas in Malaysia, found that rural and urban educational inequalities have decreased over time.

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However, education inequality continued to be greater in rural areas than in urban areas. With respect to educational expansion, the authors noted a faster rate of improvement in the average years of schooling in rural areas from 2002 to 2009 even though the urban areas continued to have higher educational attainment.

Cruces, García and Gasparini (2011) likewise established that countries with high income inequality also possess high education inequality. In the Philippines, where income inequality is evident, education inequality is also apparent (Monsod and Monsod 2003; Mesa 2007). Since education is a crucial factor in poverty alleviation and education inequality could generate welfare losses to society, it is important to monitor education inequality in the Philippines. In this light, assessment of rural-urban education inequality would be important not only as a contribution to the empirical literature but also as a source of information for educational and development policies.

The rest of the paper is organized as follows: Section II presents the methodology, Section III discusses the results of education Gini and decomposition estimates and Section IV concludes.

Methodology

The study used the highest educational attainment of the economically active population (aged 15 years old and above) in calculating the average years of schooling and the education Gini coefficient.³ Data were taken from the 1990, 2000 and 2010 Census of Housing and Population of the Philippines National Statistics Office. The formula for the average years of schooling is as follows:

$$\text{where } \mu = \sum_{i=1}^n p_i y_i \quad (1)$$

is the average

years of schooling, n is the number of schooling categories ($n = 7$) and p_i is the proportion of the population at a certain schooling category y_i . The schooling categories and their corresponding years of schooling are specified in Table 1 below, which draws heavily from Mesa (2007, p. 40-41).

Thereafter, the direct method of Thomas, Wang and Fan (2001) for the education Gini coefficient, denoted here as G , was employed:

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

The variables are defined as before.

³ The economically active population will be referred in the succeeding section as “population”.

Table 1. Educational attainment and years of schooling

Educational Attainment Level	Description^a	Years of Schooling (y_i)^b
No Schooling	Those that were reported under the category of “No Grade Completed” and those who attained only pre-school education	0
<i>PRIMARY</i>		
Partial	Those who attained 1 st to 4 th grade of elementary education	3
Complete	Those who completed 5 th to 7 th grade, elementary school graduate	6
<i>SECONDARY</i>		
Partial	High school undergraduate	8
Complete	High school graduate	10
<i>TERTIARY AND POST-TERTIARY</i>		
Partial	College undergraduates and post-secondary undergraduates and graduates	12
Complete	College graduate, post-baccalaureate, or those who completed 4 th year college or higher	14

^a The descriptions reflect the levels of highest educational attainment in the 2010 Census of Housing and Population.

^b Values of years of schooling were calculated using the formulas specified by Thomas et al. (2001: 10).

Source: Mesa (2007: 40-41)

The study then adopted the decomposition analysis of Zhang and Li (2002), which is able to estimate the contributions of rural-urban gap (between-group) and of the inequalities within urban and rural areas to overall education inequality. However, the modified decomposition formula (equation 3) of Mesa (2007) is more convenient as it renders each contribution rates in percentages. This formula is the one that was used in presenting the decomposition results.

$$100 = \left(\frac{p_1^2(\mu_1/\mu)G_1}{G} \cdot 100 \right) + \left(\frac{p_2^2(\mu_2/\mu)G_2}{G} \cdot 100 \right) + \left(\frac{G_B}{G} \cdot 100 \right) \quad (3)$$

The variables G_i , p_i , and μ_i are the education Gini coefficient, proportion of population and average years of schooling of a particular subgroup i ($i = 2$), respectively, The first two terms in the left-hand side show the respective contributions of inequality experienced within each subgroup, while the last term denoted by G_B is the between-group contribution. This G_B , also called as the residual or the gap itself, can be calculated by subtracting the within-group contributions from the inequality measure.

To account for the case of a notable resurgence in the education inequality of a particular province, equation (3) was further modified in such a way that it presents the changes not just of the rural and urban areas of a particular province, but also of its male and female populations. This modified equation is as follows:

$$\frac{\Delta G}{G_{t-1}} = \left[\sum_{k=1}^4 \frac{\Delta \left(p_k \cdot \frac{\mu_k}{\mu} \cdot G_k \right)}{G_{t-1}} \cdot 100 \right] + \left(\frac{\Delta G_B}{G_{t-1}} \cdot 100 \right) \quad (4)$$

wherein subgroup k pertains to the sectors of urban and rural males, urban and rural females and the rest are defined as before.

Results and Discussion

Average years of schooling (AYS) figures for rural-urban areas (database is available upon request) confirmed the expansion of education. However, they also provided a glimpse of the disparity in the schooling attainment between urban and rural populations. At the national level, urban population is consistently more educated than the rural population for all time periods considered such that the rural-urban AYS gap (the rough difference of their AYS) is still about 1.6 years in 2010. The educational attainment of the urban population in 2010 is already about 10 years while the analogous figure for the rural population is just around 8 years. Figure 1 below shows that the rural-urban AYS gap is narrowing over and that the educational attainment the rural and the urban populations is beginning to converge. Estimates at the provincial level also confirmed the AYS gap between the urban and rural populations, wherein the urban population frequently has the higher educational attainment level.

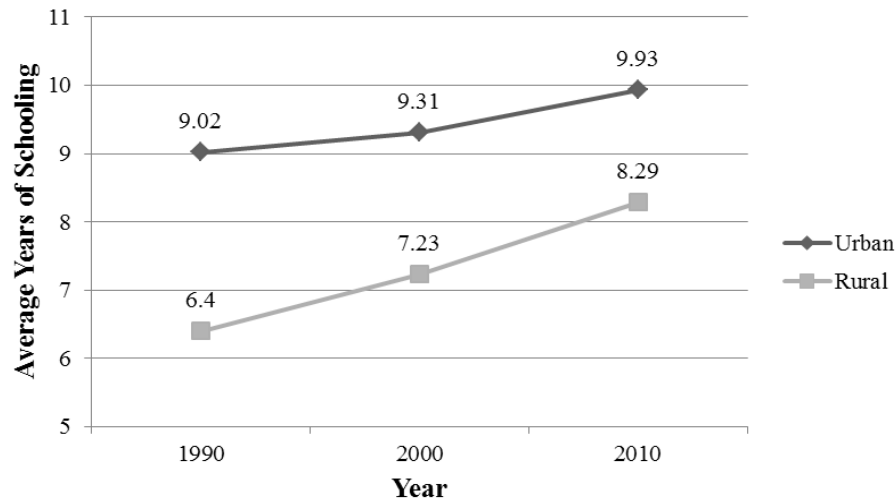


Figure 1. Average years of schooling in rural and urban areas, Philippines, 1990 – 2010

The size of the gap however varies by provinces and in some instances has actually reversed (rural areas have become more educated). These observations, in part, concur with the findings of Mohamed and Said (2012) regarding the urban population's relatively higher schooling attainment. They also mentioned the faster improvement rate of rural population's AYS and the onset of a convergence with the urban AYS which the present study has also noted.

The paper also examined the 2010 rural-urban AYS gaps in the top ten and bottom ten provinces: the ranking was determined by comparison of the overall 2010 provincial AYS estimates. It is important to note that most of the bottom ten provinces are in the Autonomous Region for Muslim Mindanao (ARMM). It is evident from Figure A in the Appendix that the provinces with lower average educational attainments tend to have larger rural-urban educational gaps. Tawi-Tawi and Sarangani stand out because while their average educational attainments are at par with the bottom ten provinces, their rural-urban educational gaps are shown to be at par with the top ten provinces. It is important to note that while Tawi-Tawi and Sarangani have rural-urban educational gaps that are at par with the rural-urban educational gaps of the top ten provinces, the average educational attainments in Tawi-Tawi and Sarangani are lower than the average educational attainments in the top ten provinces. Average years of schooling in Tawi-Tawi and Sarangani hovers around 6-8 years while average years of schooling in the top ten provinces is around 9-11 years. Sulu province has the largest rural-urban educational gap of 2.5 years in 2010; it has the lowest AYS for three consecutive periods since 1990. On the other hand, Bataan and not Batanes (the province with the highest AYS) has the smallest rural-urban educational gap in 2010—0.23 years or about 3 months of schooling.

Almost all of the education Gini coefficients for rural areas indicate that the rural subgroup experiences more disparity in educational attainment than the urban subgroup, which is also consistent with the findings of Mohamed and Said (2012). Figure 2 below illustrates these findings. The figure shows the trend of the education Gini coefficients of each subgroup at the national level for all time periods under study. The gap between the subgroups' respective educational dispersions is constantly narrowing over time from 0.087 in 1990 and eventually to 0.066 as of 2010. From 1990 to 2000, urban areas have larger rates of decline in education Gini coefficients than rural areas, averaging at about 16% in contrast to rural areas' 14%; but at the turn of the decade, rural areas registered a faster decline rate of 9.3% compared to the 8.6% in the urban areas. Though a bit slender and slow, this implies a potential catch-up for the rural population's educational distribution, assuming that it could maintain such momentum for consecutive years while holding urban's rate the same.

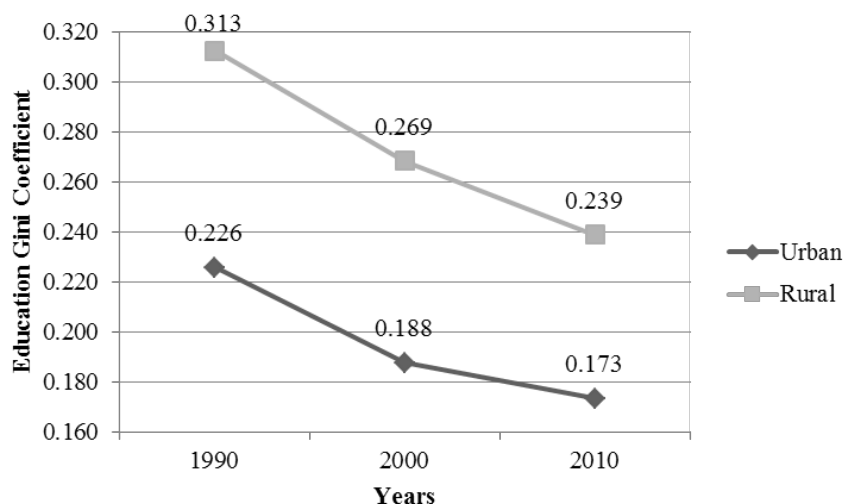


Figure 2. Education Gini coefficients of rural and urban populations, Philippines, 1990 – 2010

The contribution rates of within-group inequalities (i.e., within-urban and within-rural) and the rural-urban gap for the national and provincial level are presented in Figure 3. The study validated the finding of Mesa (2007) regarding the contribution rates of within-group inequalities being sensitive to the population size of the particular groups. The study observed that the contribution rates of within-rural inequalities at the national level mimic the increase in its population share relative to that of the urban areas—when the rural population was a relatively smaller proportion than the urban population in 1990, its contribution rate was lower as shown in Figure 3. When the rural population then outnumbered the urban population in 2000 and 2010, the rural population increased its inequality contribution rates. It is nonetheless consistent for all time periods that the rural-urban gap (education inequality gap and not educational attainment gap) is the major contributing factor to education inequality in the Philippines.

At the provincial level, the contribution rates were averaged to reflect the variations across provinces which were not manifested at the national level. If at the national level the rural-urban gap is the main contributor, in the provincial level it is the within-rural inequality that contributes most to the overall education inequality experienced by the provinces. Furthermore, the average contribution rate of within-rural inequality is also increasing throughout the decades, whereas the contributions of within-urban inequality and the rural-urban gap are consistently declining—the latter is actually experiencing a faster rate of decline. These imply that the provincial educational dispersion is becoming more and more sensitive to the changes in the distribution of educational attainments among the rural population. Since decomposition is seen to be very responsive to the population share of a particular subgroup (Mesa 2007), the study suspects that the rural population is increasing much faster than the urban population, i.e., rural areas are becoming more populous than urban areas over the years. Provinces with more populous rural areas must, therefore, monitor the population share of the uneducated rural workers since it will have a considerable bearing on their respective educational expansions and distributions.

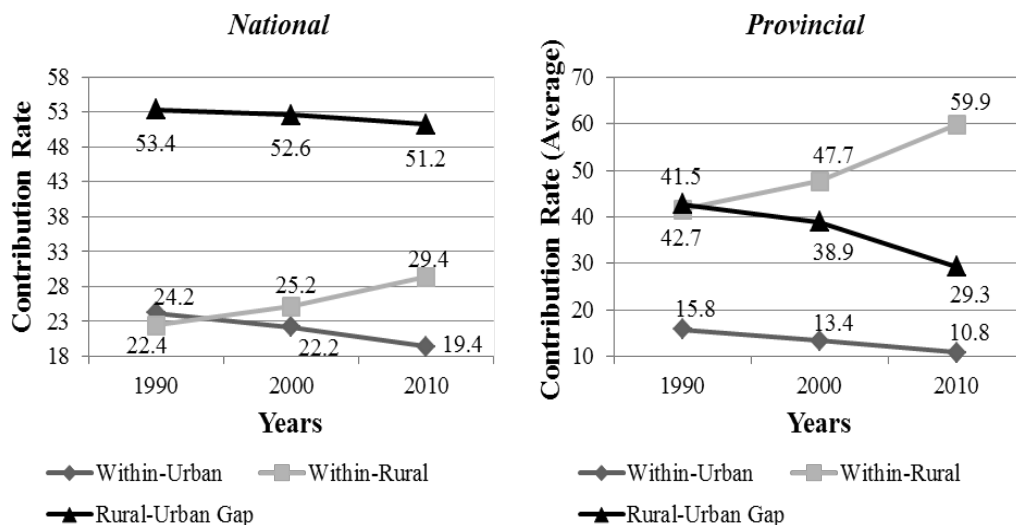


Figure 3. Trends of the contribution rates of the rural-urban gap and within-group inequalities, national and provincial levels, 1990 – 2010

The effect of the increase in the proportion of less educated members of the population can be seen in the case of Tawi-Tawi, which is the only province that registered both an increase in rural and urban education Gini coefficients (8% and 11% respectively, in 2010).⁴ Using the modified decomposition formula (equation 4) which accounts for the growth contributions of male and female subgroups in the rural-urban areas, the study was able to support the assertion above on monitoring the share of the less educated in the rural population. Table A in the Appendix specifies that all subgroups have worse educational distribution in 2010 compared to the previous decade, but only the male and female subgroups in rural areas registered positive inequality growth contributions. This means that the dismal educational distribution among the rural population in Tawi-Tawi largely caused the deterioration in its educational dispersion in the last decade. Conversely, the negative growth contributions of urban areas indicate that their population count has recently decreased, which may have been brought about by labor migration. These findings are also in line with the results of the main decomposition analysis for Tawi-Tawi which show that the rural population—having a contribution rate of 53-68%—is the main contributor to the overall education inequality in the province. Thus, the study concludes that in order to reduce education inequality in Tawi-Tawi, the educational policies of Tawi-Tawi should focus on raising the level of educational attainment in the rural areas.

Conclusion

This paper examined the level and dispersion of educational attainments in rural and urban areas, both at the national and provincial levels. Estimates of rural-urban education Gini coefficients suggest that educational distributions have improved over time. Such was also evidenced by the reported near convergence at the national level of the rural and urban educational distributions and average educational attainments.

⁴ Zamora (2014) noted that Tawi-Tawi is the only province that experienced an educational contraction and therefore a deterioration in educational distribution.

The rural educational attainment, however, continues to lag behind that of the urban areas. In fact, in most provinces, education inequality within rural areas contributes the most to their respective overall education inequalities. Rural-urban educational attainment gaps are also more pronounced in provinces with low levels of educational attainment. This was particularly illustrated by the case of the bottom ten provinces that are mostly from the ARMM.

Particular attention was given to Tawi-Tawi, which is the only one that registered both an increase in rural and urban education Gini coefficients (11% and 8%, respectively, in 2010). By modifying the formula of Zhang and Li (2002) to account for inequality growth contributions of sex subgroups in rural and urban areas, the study concluded that the dismal educational distribution of the rural labor force is the reason behind this deterioration, which stresses the importance of educational improvement in the rural sectors. On the other hand, the decreasing population count of its urban population could be attributed to labor mobility. Future studies must look into these issues more deeply.

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APPENDIX

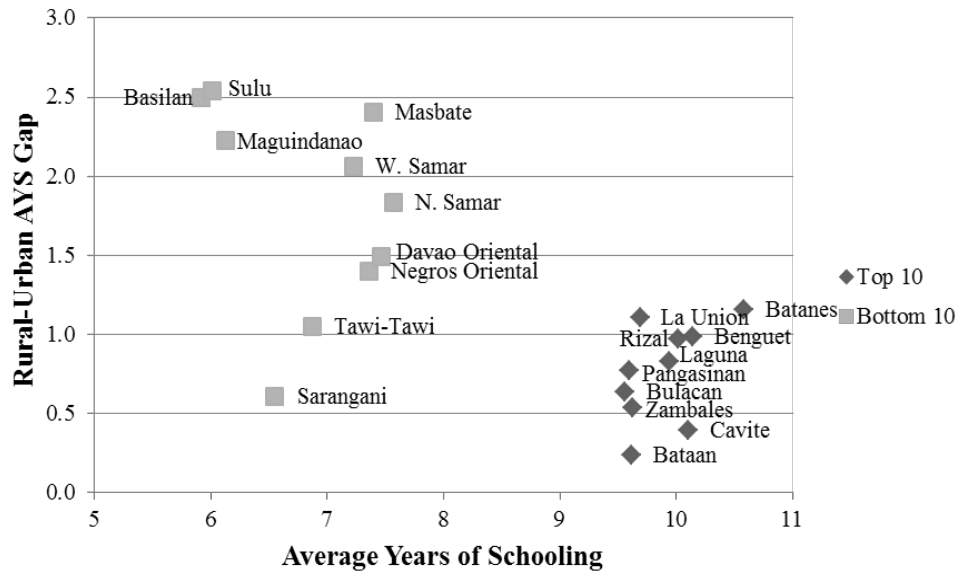


Figure A. Rural-urban AYS gaps of top ten and bottom ten provinces, 2010

Table A. Education Gini and inequality growth contributions of sex subgroups in rural and urban areas, 2000 and 2010

	Education Gini (EG) and Growth Contributions						Gap
	Male			Female			
	Within-Inequality	EG 2000	EG 2010	Within-Inequality	EG 2000	EG 2010	
Rural	5.44%	0.333	0.371	5.43%	0.353	0.370	0.92%
Urban	-0.96%	0.291	0.327	-1.01%	0.308	0.339	

Source: Authors' calculation