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Education and Expenditure Inequality in Indonesia and the Philippines: A Comparative Analysis in an Urban and Rural Dual Framework

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Abstract

Using nation-wide household surveys, this study investigates the roles of education in expenditure inequality in two archipelagic Asian countries: Indonesia and the Philippines. Since disparity between urban and rural areas is one of the main determinants of expenditure inequality and there is a large difference in educational endowments between urban and rural areas, an analysis is conducted in an urban-rural framework. Both countries achieved a notable reduction in expenditure inequality in the 2010s. In Indonesia, the reductions of disparity between education groups and tertiary education group's within-group inequality in urban areas were the main contributors to the reduction of overall expenditure inequality. In the Philippines, the reductions of expenditure disparities between urban and rural areas and between education groups were the main contributors to the reduction of overall expenditure inequality. In 2018, Indonesia and the Philippines had the same level of expenditure inequality. But, as compared to developed countries, their expenditure inequalities are still very high. In Indonesia, expenditure inequality among those with secondary education is the major determinant of overall expenditure inequality. Thus, reducing secondary group's within-group inequality is necessary. At the same time, tertiary group's within-group inequality should be decreased in urban areas. In the Philippines, expenditure inequality among those with tertiary education is the major determinant of overall expenditure inequality. Thus, reducing tertiary group's within-group inequality is imperative. At the same time, disparity between education groups should be decreased in both urban and rural areas.

1. Introduction

Education is a major determinant of income, and a positive relationship is likely to exist between inequality in educational attainment and income inequality. Whether educational expansion has narrowed or widened income inequality is of policy relevance in developing

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countries. Asian developing countries have made significant progress in education over the last decades. However, many of them still suffer from high poverty and inequality. Against this background, this study analyzes the roles of education in the distribution of economic wellbeing in two archipelagic Asian countries: Indonesia and the Philippines. The analysis is conducted in an urban and rural dual framework, since disparity between urban and rural areas is one of the main determinants of the distribution of economic wellbeing and there is a large difference in socioeconomic structure between urban and rural areas (Eastwood and Lipton, 2004; Shorrocks and Wan, 2005; Kanbur and Zhuang, 2013).

This study uses data from nation-wide household surveys conducted by central statistical offices. As a measure of economic wellbeing, it uses expenditure rather than income for the following reasons (Akita, Lukman and Yamada, 1999). First, expenditure data are usually more reliable than income data in developing countries since households in higher income groups tend to underreport their incomes. Second, welfare levels are likely to be better indicated by current expenditure than by current income. We should note, however, that expenditure inequality is usually smaller than income inequality since higher income households tend to save a larger proportion of their incomes.

We choose Indonesia and the Philippines as they share similar characteristics and make a comparative analysis between them in terms of the roles of education in the distribution of economic wellbeing. These two countries belong to the Association of South East Asian Nations (ASEAN) and are among the middle-income countries whose population exceeds 100 million. Indonesia is the world's largest archipelagic country and also the world's largest Muslim country. It comprises more than 13,000 islands. Meanwhile, the Philippines is the world's second largest archipelagic country, comprising more than 7,000 islands. These two countries are diverse in terms of geography, natural resource endowments, ethnicity and culture. Indonesia and the Philippines accommodate, respectively, 300 and 110 ethnic groups. Indonesia has the largest population in ASEAN with 268 million people in 2018, and 56% of them are living on the island of Java where the city of Jakarta is located (Table 1). The Philippines follows next in ASEAN with 107 million people. In the Philippines, 53% of the population are on the island of Luzon, where the city of Manila is located. Indonesia is more

developed than the Philippines in terms of per capita GDP; its per capita GDP is 1.4 times that of the Philippines in 2018 (Table 1). In Indonesia, however, the manufacturing share of total GDP has been declining gradually over the last two decades, while in the Philippines, after hitting the bottom in 2009, the share has been increasing since then (Table 1). As a result, the Philippines had a slightly larger manufacturing GDP share in 2018.

Table 1

Education system differs considerably between these two countries.[1] In Indonesia, the formal education system consists of four levels: preprimary; basic compulsory education including six years of primary education (starting at seven years of age) and three years of junior secondary education; three years of senior secondary education; and tertiary education (one to four years of diploma programs and international standard bachelor's, master's and doctoral programs) (Di Gropello, 2011a). At each level of education, an Islamic counterpart is available to students, which serves as an alternative to the general education system (Di Gropello, 2011a). In the Philippines before 2012, the formal education system consisted of preprimary, basic compulsory education including six years of primary education (starting at six years of age) and four years of secondary education, two years of postsecondary technical and vocational education programs or tertiary education (bachelor's, master's and doctoral programs) (Di Gropello, 2011b). Since 2013, however, basic compulsory education has been expanded to 13 years from kindergarten to senior secondary education (one year of kindergarten starting at five years of age, six years of primary education, and two years of junior and four years of senior secondary education) (UNESCO, 2015).

Indonesia and the Philippines have made steady progress in education over the last two decades. Their gross primary education ratios have exceeded 100% since the early 1990s. At the secondary education level, over the last two decades, Indonesia increased its net secondary enrollment ratio from 50% to 76%, while the Philippines raised its ratio from 51% to 66% (Figure 1). On the other hand, the progress of tertiary education differs considerably between the two countries (Figure 2). While Indonesia has made substantial progress by

[1] Because Indonesia and the Philippines have different education systems, the number of years of education assigned to each level of education differs between them (see table A1 in the appendix).

raising its gross tertiary enrollment ratio from 14% to 36%, the Philippines increased its ratio merely from 31% to 36%.

Figures 1 and 2

This study first analyzes inequality in the number of years of education among households (hereafter, educational inequality) by conducting an inequality decomposition analysis by urban and rural sectors using the Gini index.[2] It then employs the Blinder-Oaxaca decomposition method to examine the role of education in urban-rural expenditure inequality (Blinder, 1973; Oaxaca, 1973). Finally, using the two-stage hierarchical Theil decomposition method developed by Akita and Miyata (2008), this study analyzes the role of education in expenditure inequality in an urban and rural dual framework.

It should be noted that to measure expenditure inequality, the Theil index *T* is employed.[3] But, to measure educational inequality, the Gini coefficient is used since a household with no education is given 0 year of education and thus it is not possible to calculate the Theil index *T*. These inequality measures satisfy several desirable properties such as anonymity principle, mean independence, population-size independence and the Pigou-Dalton transfer principle (Anand, 1983; Haughton and Khandker, 2009). Moreover, the Theil index *T* is additively decomposable by population sub-groups, that is, total inequality can be expressed as the sum of the within- and between-group inequality components (Bourguignon, 1979; Shorrocks, 1980). However, the Gini coefficient cannot be decomposed in this way, since the residual term emerges when the distributions of population sub-groups overlap (Lambert and Aronson, 1993; Dagum, 1997).

2. Literature Review

A number of studies have been conducted to examine the relationship between the level of educational attainment, educational inequality and income inequality. Some of these studies are Knight and Sabot (1983), Ram (1989, 1990), Park (1996), Chu (2000), De Gregorio and

[2] To measure the amount of education a household owns, this study uses years of education completed by the household head.

[3] The formula of the Theil index *T* will be presented in the methodology section. In this study, another Theil index, the Theil index *L*, is also used to perform a hierarchical inequality decomposition analysis. But the result is similar to the one by the Theil index *T* qualitatively and thus it is not presented.

Lee (2002), Lin (2006) and Abdullah, Doucouliagos and Manning (2015). Based on a dataset of around 100 countries, Ram (1990) examined the relationship between the level of educational attainment and educational inequality and found that there is an inverted-U shaped relationship between the level of educational attainment and educational inequality, that is, educational inequality first increases, attains the peak and then decreases with educational expansion. Ram (1990) found also that the turning point appears to have occurred when the mean years of education is about seven.

Using a dataset of 59 countries, Park (1996) investigated the effects of the level and distribution of educational attainment on income inequality and found that a higher level of educational attainment has an equalizing effect on income distribution, while a higher level of educational inequality has a dis-equalizing effect on income distribution. De Gregorio and Lee (2002) also examined the relationship between educational variables and income inequality but using a panel dataset of more than 100 countries for the period from 1960 to 1990 and found a similar result to Park (1996), that is, higher educational attainment and more equal distribution of education appear to have played a significant role in equalizing income distribution. They observed also the Kuznets inverted-U relationship between income level and income inequality. However, they acknowledged that a significant proportion of the variation in income inequality across countries and over time remains unexplained.

Our study differs from the studies discussed above in its approach. By focusing on two archipelagic Asian countries, it examines descriptively the roles of education in expenditure inequality in an urban-rural dual framework. It employs the Theil decomposition method in two stages: first by location (urban and rural locations) and then by education. A number of studies have been conducted to explore the determinants of income or expenditure inequality using the Theil decomposition method.[4] According to the studies that examined the role of education using the Theil decomposition method, education is one of the major determinants

[4] These studies include Ikemoto (1985) for Malaysia, Glewwe (1986) for Sri Lanka, Ikemoto and Limskul (1987) for Thailand, Ching (1991) for the Philippines, Tsakloglou (1993) for Greece, Estudillo (1997) for the Philippines, Akita, Lukman and Yamada (1999) for Indonesia, Kanbur and Zhang (1999) for China, Parker (1999) for U.K., Dickey (2001) for Great Britain, Liu (2001) for Vietnam, Gray, Mills & Zandvakili (2003) for Canada, Mukhopadhaya (2003) for Singapore, Rao, Banerjee and Mukhopadhaya (2003) for Singapore, Motonishi (2006) for Thailand, Tang and Petrie (2009) for Australia, and Akita and Miyata (2013) for Indonesia.

of income or expenditure inequality by accounting for around 20-40% of overall inequality. On the other hand, according to the studies that analyzed the role of urban and rural locations in inequality, urban-rural disparity is another major determinant by explaining around 10-30% of overall inequality. Unlike most previous studies which employed the one-stage Theil decomposition method, our study uses the two-stage hierarchical Theil decomposition method developed by Akita and Miyata (2008).

In Indonesia, numerous studies have been conducted to explore the determinants of expenditure or income inequality using data from the National Socioeconomic Survey (*Susenas*) or the Indonesia Family Life Survey (IFLS). They include Hughes and Islam (1981), Islam and Khan (1986), Asra (1989), Akita and Lukman (1999), Akita, Lukman and Yamada (1999), Asra (2000), Akita and Miyata (2008), Akita and Miyata (2013), Hayashi, Kataoka and Akita (2014), Yusuf, Sumner and Rum (2014) and Chongvilaivan and Kim (2016). Based on the 1987, 1990 and 1993 rounds of *Susenas*, Akita, Lukman and Yamada (1999) examined the roles of location, age, education, gender and household size in expenditure inequality using the one-stage Theil decomposition method and found that expenditure disparity across education groups accounted for more than 30% of overall expenditure inequality.

On the other hand, Akita and Miyata (2008), Akita and Miyata (2013) and Hayashi, Kataoka and Akita (2014) investigated the role of education in expenditure inequality in an urban and rural dual framework using the two-stage hierarchical Theil decomposition method. Akita and Miyata (2008) used household expenditure data from the 1996, 1999 and 2002 rounds of *Susenas* to investigate the evolution of expenditure inequality associated with urbanization and education expansion and found that widening inequality among urban households with higher levels of education, together with urbanization and educational expansion, appears to have contributed to the rise of overall inequality over the period 1996-2002. Hayashi, Kataoka and Akita (2014) used household expenditure data from the panel *Susenas* to analyze the role of education in expenditure inequality from spatial perspectives over the period 2008-2010. Using several decomposition methods, they found that differences in educational attainment appear to have played an important role in expenditure

inequality within urban areas and between urban and rural areas.

In the Philippines, studies on the distribution of economic wellbeing using data from the Family Income and Expenditure Surveys (FIES) include Ching (1991), Estudillo (1997), Balisacan and Pernia (2002), Balisacan and Fuwa (2003, 2004), Pernia (2008), Son (2008), Mapa, Balisacan, Briones and Albis (2009), and Seriño (2014). Among these studies, Ching (1991), Estudillo (1997) and Seriño (2014) analyzed the roles of household attributes in income inequality using the one-stage Theil decomposition method. Using data from the 1985 round of FIES, Ching (1991) examined the roles of location, education, age, gender and household size in income inequality and found that income disparity across education groups was the largest contributor to overall income inequality by accounting for 39% of overall inequality as measured by the Theil index. On the other hand, Estudillo (1997) used data from the 1971, 1985 and 1991 rounds of FIES to analyze the roles of location, education and age in income inequality and obtained results similar to Ching (1991), where the contribution of income disparity across education groups was the largest amounting to 25-35% of overall income inequality. Based on the 2000 and 2006 rounds of FIES, Seriño (2014) considered location, education and age as the principal determinants of income inequality in Eastern Visayas (one of the 13 regions of the Philippines) and found that income disparity across education groups accounted for around 40% of overall inequality.

3. Method and The Data

3.1. Methods

Decomposition of Educational Inequality by Location (Urban and Rural Sectors)

To examine the evolution of educational inequality with respect to educational expansion, we conduct a decomposition analysis of educational inequality by location (urban and rural sectors) using the Gini coefficient. Unlike the Theil indices, the Gini coefficient cannot be decomposed into within- and between-group inequality components since an extra term emerges if the distributions of educational attainment for the urban and rural sectors overlap. Nevertheless, we employ the Gini coefficient to conduct a decomposition analysis of educational inequality by location, since there is a certain overlap between the urban and

rural sectors in the distribution of educational attainment and it is interesting to know how this overlap evolves with the expansion of education.

To obtain the decomposition equation, we consider a country containing *N* households, who are classified into the urban and rural sectors (sectors 1 and 2, respectively), and the educational level of a household is measured by the number of years of education completed by its household head. We let e_{ih}, μ and N_i be the number of years of education of household *h* in sector *i*, the mean number of years of education of all households, and the total number of households in sector i.[5] Then, overall educational inequality can be measured by the following Gini coefficient.

$$G = \frac{1}{2N^2\mu}\sum_{i=1}^{2}\sum_{j=1}^{2}\sum_{h=1}^{N_i}\sum_{k=1}^{N_j}|e_{ih} - e_{jk}| \quad (1)$$

The education Gini defined by equation (1) can be decomposed into the within-sector Gini (G_{WS}), the between-sector Gini (G_{BS}) and the residual term (G_R) as follows (Lambert and Aronson, 1993; Dagum, 1997).

$$G = G_{WS} + G_{BS} + G_R \quad (2)$$

In this equation, G_{WS} is a weighted average of the Gini coefficients for the urban and rural sectors:

$$G_{WS} = \sum_{i=1}^{2} p_i s_i G_i,$$

where p_i, s_i, and G_i are, respectively, sector *i's* share of households, sector *i's* share of the number of years of education, and the Gini coefficient of sector *i*. G_{BS} is the Gini coefficient that would be obtained if each household in a sector received the mean number of years of education for the sector, which is defined as

$$G_{BS} = \frac{1}{2N^2\mu}\sum_{i=1}^{2}\sum_{j=1}^{2}\sum_{h=1}^{N_i}\sum_{k=1}^{N_j}|\mu_i - \mu_j| = \frac{1}{2\mu}\sum_{i=1}^{2}\sum_{j=1}^{2} p_i p_j |\mu_i - \mu_j|$$

where μ_i is the mean number of years of education for sector *i*. It should be noted that the residual term, $G_R = G - G_{WS} - G_{BS}$, is zero if the distributions of years of education for the urban and rural sectors do not overlap; but takes a positive value if they overlap.

Blinder-Oaxaca Decomposition Analysis

To investigate the extent to which educational endowments account for the urban-rural

[5] Table A1 in the appendix presents the way how to determine the number of years of education completed by the head of household.

difference in mean per capita expenditure, a Blinder-Oaxaca decomposition analysis is conducted (Blinder, 1973; Oaxaca, 1973). To obtain the decomposition equation, we consider the following linear regression model for the urban and rural sectors (sectors 1 and 2, respectively),

$$y_i = \boldsymbol{X}_i'\boldsymbol{\beta}_i + e_i \qquad E(e_i) = 0 \qquad (i = 1, 2)$$

where y_i, $\boldsymbol{X}_i$, $\boldsymbol{\beta}_i$, and e_i are, respectively, the natural logarithm of per capita expenditure, a vector of independent variables, a vector of coefficients associated with independent variables, and the error term. Next, we let $\widehat{\boldsymbol{\beta}}_i$, $\widehat{\boldsymbol{\beta}}^*$ and $\overline{\boldsymbol{X}}_i$ be, respectively, a vector of the least-squares estimates for $\boldsymbol{\beta}_i$ obtained separately from the urban and rural households, a vector of the least-squares estimates of the coefficients obtained from the pooled sample of urban and rural households, and the estimate for $E(\boldsymbol{X}_i)$, then the estimated urban-rural difference in mean per capita expenditure can be given by

$$\widehat{D} = \bar{y}_1 - \bar{y}_2 = (\overline{\boldsymbol{X}}_1 - \overline{\boldsymbol{X}}_2)'\widehat{\boldsymbol{\beta}}^* + \left(\overline{\boldsymbol{X}}_1'(\widehat{\boldsymbol{\beta}}_1 - \widehat{\boldsymbol{\beta}}^*) + \overline{\boldsymbol{X}}_2'(\widehat{\boldsymbol{\beta}}^* - \widehat{\boldsymbol{\beta}}_2)\right). \qquad (3)$$

This is the twofold decomposition equation suggested by Neumark (1988). The first term in equation (3) is the part that is explained by urban-rural differences in the independent variables (endowments effect), while the second term is the unexplained part.

In the regression model, we consider, as independent variables, years of education, household size, gender, age, age squared, and unemployment. Gender is a 0-1 dummy variable where a female headed household is given one. Unemployment is also a 0-1 dummy variable where a household is given one if the household head is unemployed.

Two-Stage Hierarchical Decomposition of Expenditure Inequality by the Theil Index T

To investigate the roles of education in expenditure inequality in an urban-rural dual framework, we conduct a two-stage hierarchical inequality decomposition analysis by location and education using the Theil index *T*. In this decomposition analysis, all households are first classified into the urban and rural sectors and then, households in each of these two sectors are classified into the four education groups: no or incomplete primary education, primary education, secondary education, and tertiary education (see Table A1 in the appendix).

To obtain the two-stage hierarchical inequality decomposition equation, we let y_{ijk}, Y,

N_{ij}, and m be, respectively, the per capita expenditure of household k in education group j of sector i, total per capita expenditure of all households, the number of households in education group j of sector i, and the number of education groups. Then overall inequality in per capita expenditure is given by the Theil index T as follows:

$$T = \sum_{i=1}^{2}\sum_{j=1}^{m}\sum_{k=1}^{N_{ij}}\left(\frac{y_{ijk}}{Y}\right) log\left(\frac{{}^{y_{ijk}}/_{Y}}{{}^{1}/_{N}}\right) \quad (4)$$

If we let Y_{ij} and Y_i denote, respectively, total per capita expenditure of households in education group j of sector i and total per capita expenditure of households in sector i, then, the Theil index T given by equation (4) can be decomposed hierarchically into the between-sector inequality component (T_{BS}), the within-sector between-group inequality component (T_{WSBG}), and the within-sector within-group inequality component (T_{WSWG}) as follows.

$$\begin{aligned} T &= T_{BS} + \sum_{i=1}^{2}\left(\frac{Y_i}{Y}\right)T_i \\ &= T_{BS} + \sum_{i=1}^{2}\left(\frac{Y_i}{Y}\right)T_{BGi} + \sum_{i=1}^{2}\sum_{j=1}^{m}\left(\frac{Y_{ij}}{Y}\right)T_{ij} \\ &= T_{BS} + T_{WSBG} + T_{WSWG} \end{aligned} \quad (5)$$

where T_i, T_{BGi} and T_{ij} are, respectively, inequality within sector i, inequality between education groups in sector i, and inequality within education group j of sector i. Equation (5) presents the two-stage hierarchical inequality decomposition equation for location and education (for details, see Akita and Miyata, 2008 and Akita and Miyata, 2013).

3.2. The Data

This study uses the 2011 and 2018 rounds of the National Socioeconomic Survey (*Susenas*) for Indonesia and the 2012 and 2018 rounds of the Family Income and Expenditure Survey (FIES) for the Philippines. They are nation-wide household surveys covering all regions and provinces. In Indonesia, *Susenas* has been conducted by the Central Bureau of Statistics every year or two since 1963, while in the Philippines, FIES has been conducted every three to six years since 1957 by the National Statistical Office. Table 2 presents their sample sizes. It also provides the distribution of households across education groups in urban and rural areas, where the distributions of households are estimated using sampling household weights. The sample sizes are large enough to estimate inequalities by education groups in urban and rural areas.

Table 2

4. Empirical Results

4.1. Decomposition of Education Gini by Location (Urban and Rural Sectors)

Before examining the roles of education in expenditure inequality, it is instructive to analyze educational inequality since a positive relationship is likely to exist between educational inequality and expenditure inequality (De Gregorio and Lee, 2002). Tables 3 and 4 present the result of the decomposition of education Gini by urban and rural locations for Indonesia and the Philippines, respectively, where the education Gini is estimated using sampling household weights.

Tables 3 and 4

In Indonesia, the mean level of educational attainment has increased in both urban and rural areas, where the no or incomplete primary education group has lowered its population share while the primary and secondary education groups have raised their shares (see Table 2). In 2011, the mean years of education in the urban and rural sectors were, respectively, 9.2 and 6.3 years, but increased to 9.3 and 6.7 years in 2018. The speed of educational expansion has been faster in rural than in urban areas; thus, the urban-rural ratio in mean years of education has declined to 1.39 in 2018 from 1.46. Nonetheless, a noticeable educational disparity still existed between the urban and rural sectors. Overall educational inequality has decreased substantially from 0.330 to 0.293 (Table 3). The expansion of primary and secondary education appears to have not only reduced educational disparity between the urban and rural sectors but also educational inequality within the rural sector. Their combined contribution to overall educational inequality has thus declined from 49.2% to 45.4%. The urban sector has also reduced its educational inequality from 0.291 to 0.253; but, its contribution to overall educational inequality has increased from 26.0% to 29.5% due to the rising share of urban population. We should note that the proportion of the tertiary education group was still very small though tertiary sector's gross enrolment ratio has risen significantly over the last two decades (Table 2 and Figure 2).

In the Philippines too, the mean level of educational attainment has risen in both urban and rural areas, where the no or incomplete primary education and primary education groups lowered their population share while the secondary group raised its share (see Table 2). In 2012, the mean years of education in the urban and rural sectors were, respectively, 9.5 and 7.3 years, but has increased to 9.6 and 7.6 years in 2018. It should be noted that the speed of educational expansion has been faster in rural than in urban areas; thus, the urban-rural ratio in mean years of education has declined to 1.26 in 2018 from 1.30. Overall educational inequality has declined from 0.271 to 0.254. The expansion of secondary education appears to have not only reduced educational disparity between the urban and rural sectors but also educational inequality within the rural sector. Their combined contribution to overall educational inequality has declined substantially from 53.7% to 44.9%. The urban sector has also lowered its educational inequality from 0.220 to 0.214; but, its contribution to overall educational inequality has increased considerably from 18.7% to 25.4% due to the rising share of urban population.

In sum, the expansion of education has lowered overall educational inequality in Indonesia and the Philippines over the study period. Both countries seem to have passed the turning point in an inverted-U shaped curve for the level of educational attainment and educational inequality.[6]

4.2. Blinder-Oaxaca Decomposition Analysis

We found in the previous subsection that the expansion of compulsory education has reduced overall educational inequality in Indonesia and the Philippines. However, while educational disparity between the urban and rural sectors has declined, a noticeable difference still existed in educational endowments between the urban and rural sectors in both countries. To what extent does the educational disparity contribute to difference in mean per capita expenditure between the urban and rural sectors? This subsection tries to answer this question using the Blinder-Oaxaca decomposition method.

[6] Ram (1990) argued that educational inequality may decline monotonically with educational expansion for less-developed countries which have already reached a certain level of educational attainment and have adopted free and universal primary education.

Tables 5 and 6 present the result of the Blinder-Oaxaca decomposition analysis for Indonesia and the Philippines, respectively. In both countries, urban-rural difference in educational endowments has been the major determinant of the urban-rural difference in mean per capita expenditure; it accounted for 30-40% of the urban-rural difference in mean per capita expenditure. This suggests that narrowing urban-rural educational gap is the key to reduce the expenditure disparity. As discussed previously, primary education has been compulsory in both countries for many years; thus, its gross enrollment ratio has been exceeding 100%. However, many rural households have not completed primary education. Thus, promoting and strengthening primary and secondary education is essential in rural areas to reduce urban-rural educational gap.

Tables 5 and 6

4.3. Hierarchical Decomposition of Expenditure Inequality by Location and Education

To examine the roles of education in expenditure inequality, this section conducts a two-stage hierarchical inequality decomposition analysis, where expenditure inequality is estimated using sampling household weights. Tables 7 and 8 present the result of the analysis, respectively, for Indonesia and the Philippines, where the contributions are all measured against overall expenditure inequality.

Tables 7 and 8

4.3.1. Indonesia

In Indonesia, overall expenditure inequality has decreased from 0.322 to 0.294 over the study period (Table 7). According to the expenditure shares of decile groups (Table 9), the richest decile group lowered its expenditure share from 32.2% to 30.8%. The poorest three decile groups also reduced their shares; their combined expenditure share has declined from 11.6% to 11.1%. On the other hand, the middle decile groups raised their expenditure shares. According to Table 1, Indonesia registered a slightly higher level of economic growth than ASEAN as a whole in the study period; but, the growth seems to have favored the middle income segment of the population disproportionally. Though expenditure inequality has

declined, the growth was not pro-poor. According to the World Development Indicators (World Bank, 2021), the poverty headcount ratio has declined from 12.5% to 9.8%, but this is due primarily to the poverty-reducing growth effect.

Like other Asian countries, the urban sector has a much larger expenditure inequality than the rural sector due to the heterogeneous nature of its economy accommodating a wide variety of job opportunities (Eastwood and Lipton, 2004). During the study period, urbanization has proceeded rapidly; in 2011, the urban sector accounted for 49.9% of all households, but its share has risen to 54.7% in 2018 (see Table 3). Due mainly to the rising share of urban households, the level and trend of urban inequality resemble very closely those of overall inequality. Both urban and rural inequalities have decreased in the study period. According to the expenditure shares of decile groups (Table 9), in both urban and rural sectors, the richest decile group lowered its expenditure share. At the same time, the poorest three decile groups reduced their shares. On the other hand, the middle decile groups gained their expenditure shares. In both sectors, the economic growth was not pro-poor, though their expenditure inequalities have fallen. Compared to within-sector inequalities, expenditure disparity between the urban and rural sectors was not large. It was 0.034 in 2011, and has fallen to 0.028 in 2018 thanks in part to declining urban-rural disparity in educational endowments (see Tables 3 and 5). The contribution of the between-sector inequality to overall expenditure inequality has thus declined to 9.5% in 2018 from 10.5%.[7] In other words, more than 90% of overall inequality was due to inequalities within the urban and rural sectors.

As shown in Table 7, there is a notable difference between the urban and rural sectors in the contribution of expenditure disparity between education groups. In urban areas, the between-group expenditure disparity was a prominent contributor to overall inequality, but not in rural areas. Between-group expenditure disparity has declined in both urban and rural areas. Particularly, the urban sector reduced its between-group disparity notably from 0.076 in 2011 to 0.054 in 2018. The contribution of urban sector's between-group disparity to overall inequality has thus decreased from 14.8% to 12.1%. In urban areas, all but no or

[7] The between-sector inequality refers to expenditure disparity between the urban and rural sectors, while the between-group disparity refers to expenditure disparity between educational groups.

incomplete primary education group lowered their within-group expenditure inequalities. Particularly, the tertiary group lowered its inequality substantially from 0287 to 0.253 and its contribution to overall inequality has declined from 14.2% to 12.2%. The secondary education group also lowered its inequality, but only slightly. Owing to its expansion, however, its contribution to overall inequality has increased substantially from 23.7% to 28.3%. On the other hand, in rural areas, all but tertiary education group reduced their expenditure inequalities. Particularly, the secondary education group lowered its inequality conspicuously. Though the secondary group has expanded in rural areas, its contribution to overall inequality has declined from 8.6% to 7.3%. This is in contrast to urban areas. We should note that if we exclude the no or incomplete education group, the tertiary education group had the highest within-group inequality, which is followed by the secondary and primary education groups in both urban and rural areas.

In sum, the reductions of the disparity between education groups and tertiary group's within-group inequality in urban areas were the main contributors to the reduction of overall expenditure inequality. Their combined contribution to overall inequality has decreased notably from 29.0% (= 14.8% + 14.2%) in 2011 to 24.3% (12.1% + 12.2%) in 2018. The reduction of the urban-rural expenditure disparity also contributed to the reduction of overall inequality.

4.3.2. The Philippines

In the Philippines, overall expenditure inequality has declined prominently from 0.380 to 0.297 over the study period (Table 8). According to the expenditure shares of decile groups (Table 10), the richest decile group has lowered its expenditure share substantially from 34.9% in 2012 to 31.1% in 2018. The second richest decile group also lowered its share, though only slightly from 16.4% to 15.9%. On the other hand, the other poorer decile groups raised their shares. According to Table 1, the country grew relatively rapidly; its growth rate at around 6% was much higher than the average growth rate in ASEAN. These observations suggest that the Philippines achieved a highly pro-poor growth in the study period because its growth benefitted poorer groups disproportionally (Kakwani and Pernia, 2000). According

to the World Development Indicators (World Bank, 2021), the poverty headcount ratio has declined substantially from 25.2% in 2012 to 16.7% in 2018.

The urban sector has a larger expenditure inequality than the rural sector (Table 8). But, the difference is not large. During the study period, both urban and rural inequalities have decreased. According to the expenditure shares of decile groups (Table 10), in both urban and rural sectors, the richest decile group lowered its expenditure share substantially (from 33.0% to 29.9% in the urban sector and from 33.1% to 29.9% in the rural sector). The second richest decile group also lowered its share, though only slightly. On the other hand, the other poorer decile groups raised their shares. In both urban and rural sectors, the growth appears to have been highly pro-poor. Compared to expenditure inequalities within the urban and rural sectors, expenditure disparity between the urban and rural sectors was not large. It was 0.045 in 2012, and has declined to 0.029 in 2018 due in part to declining urban-rural disparity in educational endowments (see Tables 4 and 6). The contribution of the between-sector inequality to overall expenditure inequality has thus declined to 9.7% in 2018 from 11.9%. In other words, more than 90% of overall inequality was due to inequalities within the urban and rural sectors.

Unlike Indonesia, no notable urban-rural difference exists in expenditure disparity between education groups (Table 8). In urban areas, the between-group expenditure disparity has declined from 0.082 in 2012 to 0.059 in 2018, while in rural areas, it has declined from 0.084 to 0.055. In 2018, urban sector's between-group inequality accounted for 12.6% of overall inequality, while rural sector's between-group inequality accounted for 6.7% of overall inequality. In urban areas, all education groups lowered their within-group expenditure inequalities. Particularly, the tertiary group lowered its inequality substantially from 0293 to 0.257 though its contribution to overall inequality has increased slightly from 24.5% to 26.1%. The secondary education group also lowered its inequality from 0.204 to 0.172; but, its contribution to overall inequality has increased substantially due to the expansion of the secondary group (Table 2). In rural areas too, all education groups lowered their within-group expenditure inequalities. Particularly, the tertiary education group reduced its contribution to overall inequality from 10.3% to 9.3%, though it has expanded slightly (Table 2). We should note that in both urban and rural areas, the tertiary education group had

the highest inequality and remained the major contributor to overall inequality; in 2018, it accounted for 35.4% in the country as a whole (26.1% + 9.3%).

In sum, the reductions of the expenditure disparities between the urban and rural sectors and between education groups were the main contributors to the reduction of overall expenditure inequality; the combined contribution to overall inequality has declined from 33.7% (= 11.9% + 21.8%) to 29.0% (= 9.7% + 19.3%). The reductions of expenditure inequalities within education groups also contributed to the reduction. But, the reduction of tertiary group's within-group inequality contributed most to the reduction of overall inequality though the contribution has risen slightly from 34.8% (= 24.5% + 10.2%) to 35.4% (= 26.1% + 9.3%).

5. Conclusion

Using data from nation-wide household surveys, this study investigated the roles of education in expenditure inequality in Indonesia and the Philippines. Since expenditure disparity between urban and rural areas is one of the main determinants of expenditure inequality and there is a large difference in the socioeconomic structure between urban and rural areas, an analysis was made in an urban-rural framework.

The main findings are summarized as follows. First, in both countries, the mean years of education has increased. In Indonesia, the population shares of the primary and secondary education groups have increased, while in the Philippines, the population share of the secondary group has risen. Second, in both countries, the expansion of compulsory education has been associated with declining educational inequality in urban and rural areas. The speed of educational expansion has been faster in rural areas than in urban areas; thus, the urban-rural ratio in mean years of education has declined. Nonetheless, a noticeable difference in educational endowments still existed between the urban and rural sectors in both countries. Third, according to the Blinder-Oaxaca decomposition analysis, urban-rural difference in educational endowments has been the major determinant of the urban-rural difference in mean per capita expenditure in both countries. It accounted for 30-40% of the urban-rural difference in mean per capita expenditure.

Fourth, overall expenditure inequality has declined in both countries. In Indonesia, the richest decile group lowered its expenditure share in both urban and rural areas. At the same time, the poorest three decile groups also reduced their shares. Indonesia registered a slightly higher level of economic growth than ASEAN as a whole; but, its growth seems to have favored the middle income groups disproportionally. Though expenditure inequality has declined, the growth was not pro-poor. In the Philippines, the richest decile group has lowered its expenditure share substantially in both urban and rural areas. The second richest decile group also lowered its share, though only slightly. The Philippines grew relatively rapidly; its growth rate was much higher than the average growth rate in ASEAN. Unlike Indonesia, the country achieved a highly pro-poor growth in both urban and rural areas. The poverty headcount ratio has declined substantially.

Fifth, in Indonesia, the reductions of the disparity between education groups and tertiary group's within-group inequality in urban areas were the main contributors to the reduction of overall expenditure inequality. The reduction of the urban-rural expenditure disparity also contributed to the reduction, but not as much as those of the disparity between education groups and tertiary group's within-group inequality in urban areas. In the Philippines, the reductions of the expenditure disparities between the urban and rural sectors and between education groups were the main contributors to the reduction of overall expenditure inequality. The reduction of expenditure inequalities within education groups also contributed to the reduction. But, the reduction of tertiary group's within-group inequality contributed most to the reduction though the contribution to overall inequality has risen slightly.

Both Indonesia and the Philippines achieved a notable reduction in expenditure inequality in the 2010s. In 2018, they had the same level of expenditure inequality. But, their expenditure inequalities are still very high as compared to the level in developed countries. In both countries, expenditure inequality among those with tertiary education is very high. Particularly, in the Philippines, it is the major determinant of overall expenditure inequality by accounting for 35% of overall inequality. Thus, decreasing tertiary group's within-group inequality is imperative in reducing overall expenditure inequality. At the same time,

inequality between education groups should be decreased in both urban and rural areas because its contribution to overall inequality amounts to 20%. On the other hand, in Indonesia, expenditure inequality among those with secondary education is the major determinant of overall expenditure inequality by accounting for 35% of overall inequality. Thus, decreasing secondary group's within-group inequality is imperative in reducing overall expenditure inequality. At the same time, tertiary group's within-group inequality should be decreased in urban areas, though its contribution is not as large as that of secondary group's inequality.

This study is not without limitations. First, our Blinder-Oaxaca decomposition analysis may suffer from an endogeneity problem due to reverse causality between the dependent variable and years of education. In our future research, we could employ an instrumental variable technique to solve this endogeneity problem. Second, the tertiary education group had the highest expenditure inequality and appears to have played an increasingly important role in determining overall inequality in both countries. Thus, an exploration of the factors of its within-group expenditure inequality would be one of our possible future studies. Third, our study period is confined to the 2010s before the outbreak of the Covid-19. Thus, it would be interesting to explore the determinants of expenditure inequality in the 2000s and/or during the Covid-19 pandemic and compare the results with the one obtained in this study.

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Table 1. GDP and Manufacturing Value Added at Constant 2010 US Dollars

	GDP, population, and manufacturing VA				Growth rate (%)		
	2005	2010	2015	2018	05-10	10-15	15-18
GDP (million US dollars)							
Indonesia	571,205	755,094	988,129	1,146,845	5.6	5.4	5.0
Philippines	156,874	199,591	266,055	322,301	4.8	5.7	6.4
ASEAN	1,517,081	1,974,459	2,528,391	2,925,696	5.3	4.9	4.9
Population (thousand)							
Indonesia	226,289	241,834	258,383	267,663	1.3	1.3	1.2
Philippines	86,326	93,967	102,113	106,652	1.7	1.7	1.4
ASEAN	559,796	595,411	632,637	653,471	1.2	1.2	1.1
Per capita GDP (US dollars)							
Indonesia	2,524	3,122	3,824	4,285	4.3	4.1	3.8
Philippines	1,817	2,124	2,605	3,022	3.1	4.1	4.9
ASEAN	2,710	3,316	3,997	4,477	4.0	3.7	3.8
Manufacturing value added (million US dollars)							
Indonesia	136,991	166,412	212,810	241,272	3.9	4.9	4.2
Philippines	35,968	42,802	59,606	72,605	3.5	6.6	6.6
ASEAN	364,035	452,070	556,238	627,241	4.3	4.1	4.0
Ratio of manufacturing value added to total GDP (%)							
Indonesia	24.0	22.0	21.5	21.0			
Philippines	22.9	21.4	22.4	22.5			
ASEAN	24.0	22.9	22.0	21.4			

(Note) ASEAN excludes Brunei.
(Source) Authors' calculation from World Development Indicators (World Bank, 2021).

Table 2. Household Surveys in Indonesia and the Philippines

	Sample size			Distribution of Households (%)		
	Urban	Rural	Total	Urban	Rural	Total
Indonesia						
2011						
No or incomplete primary	19,938	54,352	74,290	18.0	33.9	25.9
Primary	23,366	48,406	71,772	21.9	34.6	28.3
Secondary	54,701	47,475	102,176	47.5	28.8	38.1
Tertiary	15,392	4,892	20,284	12.7	2.7	7.7
Total	113,397	155,125	268,522	100.0	100.0	100.0
2018						
No or incomplete primary	19,541	52,616	72,157	16.3	30.6	22.8
Primary	26,736	55,970	82,706	22.4	36.1	28.6
Secondary	63,427	52,433	115,860	49.9	29.8	40.8
Tertiary	16,862	7,570	24,432	11.3	3.5	7.8
Total	126,566	168,589	295,155	100.0	100.0	100.0
Philippines						
2012						
No or incomplete primary	2,221	7,532	9,753	13.4	29.0	22.0
Primary	2,148	5,583	7,731	13.8	22.8	18.7
Secondary	5,882	7,802	13,684	38.9	32.1	35.2
Tertiary	5,122	3,881	9,003	33.9	16.1	24.1
Total	15,373	24,798	40,171	100.0	100.0	100.0
2018						
No or incomplete primary	8,799	22,982	31,781	12.5	26.3	19.1
Primary	8,446	17,131	25,577	13.0	21.6	17.1
Secondary	27,805	27,541	55,346	43.0	35.5	39.5
Tertiary	21,087	13,926	35,013	31.5	16.6	24.4
Total	66,137	81,580	147,717	100.0	100.0	100.0

(Note) The distribution of households is estimated using sampling weights.
(Source) *Susenas* in 2011 and 2018 for Indonesia and FIES in 2012 and 2018 for the Philippines.

Table 3. Decomposition of Educational Gini by Location (Urban and Rural Sectors), Indonesia

	Gini index	Absolute contribution	Relative contribution (%)	Population share (%)	Mean years of education
2011					
Urban sector (1)	0.291	0.086	26.0	49.9	9.2
Rural sector (2)	0.339	0.069	21.0	50.1	6.3
Within-sector (3) = (1) + (2)		0.155	47.0		
Between-sector (4)		0.093	28.2		
Urban & rural overlap (5)		0.082	24.8		
Total (6) = (3) + (4) + (5)	0.330	0.330	100.0	100	7.7
2018					
Urban sector (1)	0.253	0.087	29.5	54.7	9.3
Rural sector (2)	0.317	0.054	18.3	45.3	6.7
Within-sector (3) = (1) + (2)		0.140	47.8		
Between-sector (4)		0.079	27.1		
Urban & rural overlap (5)		0.074	25.1		
Total (6) = (3) + (4) + (5)	0.293	0.293	100.0	100	8.1

(Source) Authors' calculation based on *Susenas* in 2011 and 2018.

Table 4. Decomposition of Educational Gini by Location (Urban and Rural Sectors), Philippines

	Gini index	Absolute contribution	Relative contribution (%)	Population share (%)	Mean years of education
2012					
Urban sector (1)	0.220	0.051	18.7	44.9	9.5
Rural sector (2)	0.298	0.080	29.5	55.1	7.3
Within-sector (3) = (1) + (2)		0.131	48.2		
Between-sector (4)		0.066	24.2		
Urban & rural overlap (5)		0.075	27.6		
Total (6) = (3) + (4) + (5)	0.271	0.271	100.0	100	8.3
2018					
Urban sector (1)	0.214	0.065	25.4	52.2	9.6
Rural sector (2)	0.285	0.058	22.6	47.8	7.6
Within-sector (3) = (1) + (2)		0.122	48.0		
Between-sector (4)		0.057	22.3		
Urban & rural overlap (5)		0.075	29.6		
Total (6) = (3) + (4) + (5)	0.254	0.254	100.0	100	8.6

(Source) Authors' calculation based on FIES in 2012 and 2018.

Table 5. Blinder-Oaxaca Decomposition of Urban-Rural Difference in Mean Per Capita Expenditure, Indonesia

	2011			2018		
	Coefficient	Z-value	Contribution (%)	Coefficient	Z-value	Contribution (%)
Differential						
Prediction for urban sector	13.338	6,679.1		13.950	7,115.2	
Prediction for rural sector	12.921	8,858.1		13.569	9,452.5	
Difference	0.417	168.6	100.0	0.381	156.6	100.0
Explained part						
Years of education	0.176	134.6	42.2	0.154	132.4	40.5
Household size	0.004	5.1	1.0	0.009	10.5	2.4
Gender	0.000	2.9	0.0	0.000	-2.5	-0.1
Age	-0.013	-13.0	-3.2	-0.002	-1.8	-0.5
Age squared	0.011	12.7	2.6	0.002	2.0	0.5
Unemployment	0.002	6.4	0.4	0.001	5.1	0.4
Total	0.180	121.7	43.1	0.165	116.1	43.2
Unexplained part						
Total	0.237	106.5	56.9	0.216	96.8	56.8

(Source) Authors' calculation based on *Susenas* in 2011 and 2018

Table 6. Blinder-Oaxaca Decomposition of Urban-Rural Difference in Mean Per Capita Expenditure, Philippines

	2012			2018		
	Coefficient	Z-value	Contribution (%)	Coefficient	Z-value	Contribution (%)
Differential						
Prediction for urban sector	10.729	1,755.3		10.930	4,105.1	
Prediction for rural sector	10.167	2,344.5		10.469	4,816.6	
Difference	0.562	75.0	100.0	0.461	134.2	100.0
Explained part						
Years of education	0.198	50.7	35.3	0.151	90.4	32.8
Household size	0.006	2.0	1.0	-0.001	-0.7	-0.2
Gender	0.004	6.9	0.7	0.003	11.8	0.6
Age	-0.026	-7.4	-4.5	-0.027	-13.9	-5.8
Age squared	0.017	6.5	3.0	0.019	13.3	4.1
Unemployment	0.007	9.2	1.2	0.001	6.7	0.3
Total	0.206	40.4	36.7	0.147	63.1	31.8
Unexplained part						
Total	0.356	59.7	63.3	0.314	114.2	68.2

(Source) Authors' calculation based on FIES in 2012 and 2018.

Table 7. Hierarchical Decomposition of Expenditure Inequality by Location and Education, Indonesia

	Theil T	Contribution (%)	Expenditure share (%)		Theil T	Contribution (%)	Expenditure share (%)
2011							
Total (1) = (2)+ (3)	0.322	100.0					
B-sector (2)	0.034	10.5					
W-sector (3) = (a) + (d)	0.288	89.5					
Urban sector (a) = (b) + (c)	0.330	64.5	62.9	Rural sector (d) = (e) + (f)	0.217	25.0	37.1
B-group (b)	0.076	14.8		B-group (e)	0.019	2.2	
W-group (c)	0.254	49.7		W-group (f)	0.198	22.8	
No or incomplete primary	0.231	5.0	7.0	No or incomplete primary	0.185	6.2	10.8
Primary	0.231	6.8	9.4	Primary	0.180	6.6	11.8
Secondary	0.250	23.7	30.6	Secondary	0.219	8.6	12.6
Tertiary	0.287	14.2	15.9	Tertiary	0.234	1.4	2.0
2018							
Total (1) = (2) + (3)	0.294	100.0					
B-sector (2)	0.028	9.5					
W-sector (3) = (a) + (d)	0.266	90.5					
Urban sector (a) = (b) +(b)	0.302	68.0	66.3	Rural sector (d) = (e) + (f)	0.196	22.5	33.7
B-group (b)	0.054	12.1		B-group (e)	0.017	2.0	
W-group (c)	0.248	55.9		W-group (f)	0.179	20.5	
No or incomplete primary	0.279	7.5	7.9	No or incomplete primary	0.171	5.2	8.9
Primary	0.227	8.0	10.3	Primary	0.164	6.2	11.2
Secondary	0.245	28.3	33.9	Secondary	0.187	7.3	11.4
Tertiary	0.253	12.2	14.2	Tertiary	0.249	1.8	2.2

(Source) Authors' calculation based on *Susenas* in 2011 and 2018

Table 8. Hierarchical Decomposition of Expenditure Inequality by Location and Education, Philippines

	Theil T	Contribution (%)	Expenditure share (%)		Theil T	Contribution (%)	Expenditure share (%)
2012							
Total (1) = (2)+ (3)	0.380	100.0	100.0				
B-sector (2)	0.045	11.9					
W-sector (3) = (a) + (d)	0.335	88.1					
Urban sector (a) = (b) + (c)	0.340	53.5	59.9	Rural sector (d) = (e) + (f)	0.328	34.6	40.1
B-group (b)	0.082	13.0		B-group (e)	0.084	8.8	
W-group (c)	0.257	40.5		W-group (f)	0.245	25.8	
No or incomplete primary	0.283	3.2	4.3	No or incomplete primary	0.189	3.7	7.5
Primary	0.211	3.0	5.3	Primary	0.213	4.1	7.4
Secondary	0.204	9.9	18.5	Secondary	0.232	7.7	12.7
Tertiary	0.293	24.5	31.8	Tertiary	0.308	10.3	12.7
2018							
Total (1) = (2)+ (3)	0.297	100.0	100.0				
B-sector (2)	0.029	9.7					
W-sector (3) = (a) + (d)	0.268	90.3					
Urban sector (a) = (b) + (c)	0.274	59.0	64.1	Rural sector (d) = (e) + (f)	0.258	31.2	35.9
B-group (b)	0.059	12.6		B-group (e)	0.055	6.7	
W-group (c)	0.215	46.4		W-group (f)	0.203	24.6	
No or incomplete primary	0.202	3.1	4.6	No or incomplete primary	0.166	3.7	6.6
Primary	0.185	3.7	5.9	Primary	0.171	3.8	6.5
Secondary	0.172	13.5	23.4	Secondary	0.189	7.9	12.4
Tertiary	0.257	26.1	30.2	Tertiary	0.264	9.3	10.4

(Source) Authors' calculation based on FIES in 2012 and 2018.

Table 9. Expenditure Shares of Decile Groups, Indonesia (in %)

	Total			Urban sector			Rural sector		
	2011	2018	Change	2011	2018	Change	2011	2018	Change
1	3.0	2.7	-0.3	2.8	2.5	-0.3	3.7	3.3	-0.4
2	3.9	3.8	-0.2	3.7	3.6	-0.2	4.7	4.5	-0.2
3	4.8	4.7	-0.1	4.6	4.5	-0.1	5.6	5.5	0.0
4	5.6	5.6	0.0	5.5	5.4	0.0	6.4	6.5	0.0
5	6.6	6.7	0.1	6.5	6.6	0.1	7.4	7.6	0.2
6	7.8	8.1	0.3	7.8	8.1	0.3	8.6	9.0	0.4
7	9.3	9.7	0.4	9.4	10.0	0.6	10.0	10.6	0.6
8	11.5	12.0	0.5	11.8	12.4	0.7	11.9	12.5	0.6
9	15.3	15.9	0.5	15.7	16.2	0.4	14.8	15.1	0.3
10	32.2	30.8	-1.4	32.3	30.7	-1.5	26.8	25.5	-1.4
Total	100.0	100.0		100.0	100.0		100.0	100.0	

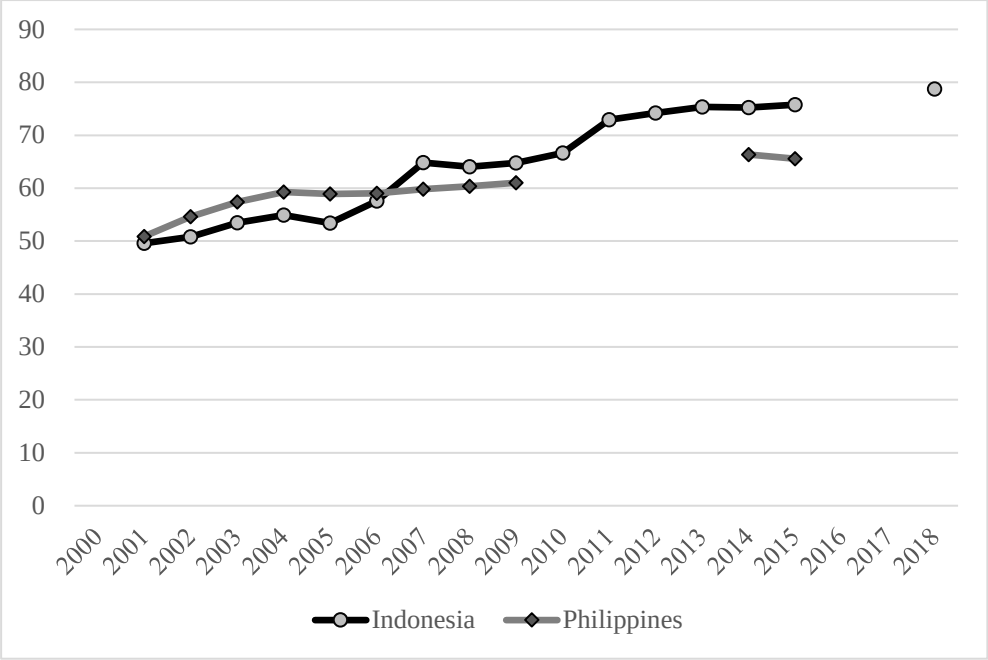
(Source) Authors' calculation based on *Susenas* in 2011 and 2018

Table 10. Expenditure Shares of Decile Groups, Philippines (in %)

	Total			Urban sector			Rural sector		
	2012	2018	Change	2012	2018	Change	2012	2018	Change
1	2.2	2.7	0.4	2.2	2.7	0.4	2.7	3.2	0.4
2	3.2	3.8	0.6	3.4	3.9	0.5	3.8	4.3	0.5
3	4.0	4.7	0.6	4.4	4.9	0.6	4.6	5.2	0.6
4	4.9	5.6	0.7	5.3	5.9	0.6	5.4	6.0	0.6
5	6.0	6.7	0.7	6.5	7.0	0.6	6.4	7.0	0.6
6	7.4	8.0	0.6	7.7	8.3	0.5	7.5	8.1	0.5
7	9.2	9.7	0.5	9.4	9.8	0.4	9.1	9.5	0.4
8	11.8	12.0	0.2	11.9	12.0	0.0	11.5	11.6	0.1
9	16.4	15.9	-0.5	16.2	15.6	-0.5	15.9	15.3	-0.5
10	34.9	31.1	-3.8	33.0	29.9	-3.1	33.1	29.9	-3.2
Total	100.0	100.0		100.0	100.0		100.0	100.0	

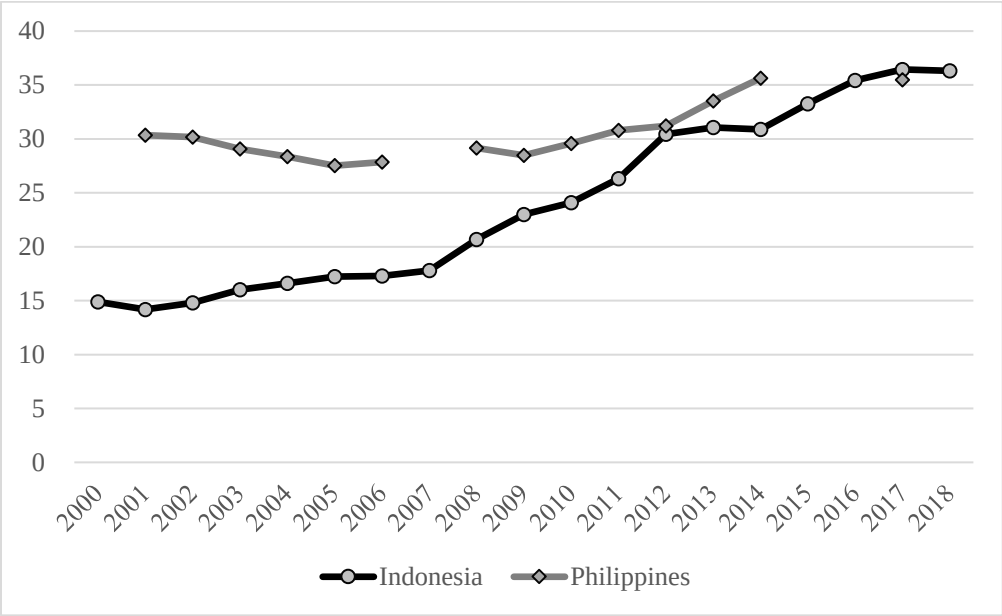
(Source) Authors' calculation based on FIES in 2012 and 2018.

Figure 1. Net Enrolment Ratio, Secondary Education



(Source) World Development Indicator (World Bank)

Figure 2. Gross Enrolment Ratio, Tertiary Education



(Source) World Development Indicator (World Bank)

Table A1. Years of Education

	Education	Years of education
Indonesia		
No or incomplete primary	No education	0
	Pre-primary or incomplete primary education	3
Primary	General or Islamic primary education	6
Secondary	General or Islamic junior secondary education	9
	General, Islamic or vocational senior secondary education	12
Tertiary	Diploma I or II programs	13
	Diploma III programs	15
	Diploma IV or bachelor's degree programs	16
	Master’s or doctor’s degree programs	18
Philippines		
No or incomplete primary	No education	0
	Pre-primary or incomplete primary education	3
Primary	Primary education	6
Secondary	Incomplete secondary education	8
	Secondary education	10
Tertiary	Technical or vocational education	12
	Bachelor's degree programs	14
	Master’s or doctor’s degree programs	16

(Sources) *Susenas* for Indonesia and FIES for the Philippines.