Urban-Rural Disparity and the Role of Education in Asian Developing Countries: An Analysis Using the Blinder-Oaxaca Decomposition Method

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1. Introduction

Studies on inequality in developing countries have actively been conducted by World Bank, Asian Development Bank (ADB) and United Nations University-World Institute for Development Economics Research (UNU-WIDER), which published, for example, World Bank (2005), Ravallion (2016), ADB (2012), Zhuang (2010), and Kanbur and Venables (2005). Most of these studies have analyzed inequality in developing economies, based on cross-country data or aggregate data which are easy to obtain and handle.

On the other hand, there are only a limited number of studies on spatial inequality in a certain country, with attention to location groups (e.g., urban and rural areas), using time-series and nationwide household survey data which are not easy to obtain and handle. Among them are, for example, Yusuf *et al.* (2014), Balisacan and Fuwa (2004), Cain *et al.* (2008), and Gustafsson *et al.* (2008).

As distinguished development economists such as Lewis (1954), Harris and Todaro (1970), and Kuznets (1955) pointed out, since social and economic inequality observed between urban and rural areas has been very large, it might be a critical challenge for developing countries to solve this problem from the viewpoint of ensuring fairness. ADB (2012) also emphasizes that the widening income disparity between urban and rural areas in Asian countries over recent years should be solved immediately. However, even though spatial inequality must be such an important issue, this field has not been much studied

* The author is grateful to the Japan Society for the Promotion of Science for its financial support (Grant-in-aid for Scientific Research No. 17K03714 and No. 20K01690). The author is also grateful to Chuo University for its financial support (Grant for Special Research).

until now due to types of data and/or decomposition methods.

This study selects Indonesia, the Philippines and India as its research target countries based on the following criteria: 1) large population size in light of the effective use of research results; 2) spatial expanse in light of the spatial analysis; and 3) availability of household survey data in light of the execution possibility. Using time-series and nationwide household survey data of those three countries, the study focuses on inequality between urban and rural areas and examines the role of education in urban-rural disparity, with reference to my previous studies such as Hayashi *et al.* (2014), Hayashi *et al.* (2015), and Hayashi and Kalirajan (2018).

Indonesia, the Philippines and India have achieved a steady economic development, with an average annual growth rate in real GDP per capita of 3.8 percent, 2.8 percent and 5.1 percent, respectively, between 2000 and 2010, despite the outbreak of the Lehman shock. Among Asian countries, Indonesia, the Philippines and India are large countries, with their population of approximately 240 million, 94 million and 1.2 billion, respectively, in 2010.

This study attempts to clarify how much influence education has had on the urban-rural gap in consumption expenditure in each of the above three countries. Specifically, the Blinder-Oaxaca decomposition method is adopted here to analyze the impact of various household characteristics such as size, gender, age, education, and production sector, on inequality between urban and rural areas in per capita household consumption expenditure, using nationwide household survey data in those three countries at two time points.

The paper is organized as follows. After Introduction here, Section 2 describes the data and methods used in this study. Section 3 gives an overview of urban-rural disparity in Indonesia, the Philippines and India. In Section 4, the role of education in urban-rural inequality is analyzed with the Blinder-Oaxaca decomposition method. Finally, Section 5 presents the main findings with some policy implications.

2. Data and Method

This study will explore the determinants of the urban-rural disparity in per capita consumption expenditure in Indonesia, the Philippines and India, respectively, and then make a comparison between the determinants in those three countries. For that purpose, the study uses household survey data in each country as indicated in Table 1, decomposes consumption expenditure data into several determinants, and compares them.

Concerning Indonesia, this study uses the *Susenas* (Survei Sosial Ekonomi Nasional or National Socio-Economic Survey) panel data on expenditure in 2008 and 2010, compiled by the Central Bureau of Statistics in Indonesia (BPS). The *Susenas* panel dataset includes about 61,000 households, of which 23,700 are in urban areas and 37,300 are in rural areas.

Table 1 Household Survey Data in Indonesia, the Philippines and India

	Indonesia	The Philippines	India
Household Survey Data used in this Study	National Socio-Economic Survey (*Susenas*): Panel dataset	Family Income and Expenditure Survey (*FIES*)	National Sample Survey (*NSS*)
Organization responsible for Household Survey	Statistics Indonesia (BPS)	Philippine Statistics Authority (PSA) (former NSO)	National Sample Survey Office (NSSO)
Years of Dataset used in this Study	2008 and 2010	1997 and 2006	1999/2000 and 2011/12
Number of Households surveyed	approx. 61,000	approx. 39,500 (1997) approx. 38,500 (2006)	approx. 120,000 (1999/2000) approx. 102,000 (2011/12)
Share of Households (Urban : Rural, %)	approx. 39 : 61 (2008, 2010)	approx. 59 : 41 (1997) approx. 45 : 55 (2006)	approx. 41 : 59 (1999/2000, 2011/12)
Deflator and Base Year	provincial urban and rural poverty lines 2008 constant prices	provincial CPI 2000 constant prices	urban and rural poverty lines of each state/union territory 2011/12 constant prices

Source: Prepared by the author.

The share of urban households estimated using sampling weights was around 47 percent in 2008, which remains constant in the study period.[1)] To adjust for spatial differences in prices at a point in time and spatial differences in inflation rates, this study converts current price expenditures into expenditures at 2008 constant prices by using current price provincial urban and rural poverty lines in 2008 and 2010.[2)]

With regard to the Philippines, our study uses household data from Family Income and Expenditure Survey (FIES) in 1997 and 2006, compiled by Philippine Statistics Authority (PSA).[3)] The FIES datasets in those two years include around 38,500 to 39,600 households, of which 45–60% are in urban areas and 40–55% are in rural areas. To analyze inequality changes in real terms, the study converts current price expenditures into expenditures at 2000 constant prices by using the 2000 consumer price index (CPI) calculated by PSA.

1) Sampling weights are used for calculations in order to adjust overestimation or underestimation of sections of the population.

2) Cameron (2002) notes that the BPS official figures and most studies in the literature do not control for the regional cost of living differences when calculating the inequality figures. According to her, spatial differences in prices are taken into account in different official poverty lines used in urban and rural areas by province, although the urban poverty line tends to be inflated relative to the rural poverty line.

3) Philippine Statistics Authority (PSA) has been established in 2013 by integrating the former National Statistics Office (NSO), National Statistical Coordination Board, Bureau of Agricultural Statistics and Bureau of Labor and Employment Statistic.

In the case of India, our study uses household consumption expenditure data from the National Sample Survey (NSS), collected and compiled by the National Sample Survey Office (NSSO) under the Indian Ministry of Statistics and Programme Implementation.[4] Specifically, the study uses the NSS 55th Round Survey (July 1999–June 2000) and 68th Round Survey (July 2011–June 2012). The NSO datasets in those two rounds include around 102,000 to 120,000 households, of which about 40% are in urban areas and 60% are in rural areas. The shares of urban households estimated using sampling weights are roughly 27% in 1999/2000 and 31% in 2011/12.

To adjust for spatial differences in prices at a point in time and spatial differences in inflation rates, the study converts current price expenditures into constant price expenditures by using current price provincial urban and rural poverty lines in 1999/2000 and 2011/12. Based on the poverty line in the urban area of Delhi (National Capital Territory) in 2011/12, per capita household expenditure at 2011/12 constant prices with consideration of spatial differences is calculated and used.[5]

In order to explore the determinants of the urban-rural disparity in mean per capita consumption expenditure, this study uses household survey data for the above three countries and performs a Blinder-Oaxaca decomposition analysis, which was popularized by Blinder (1973) and Oaxaca (1973).[6]

Let Y_U and Y_R be the natural log of per capita expenditure of urban and rural households, respectively. Given the linear regression model,

$$Y_k = X_k'\beta_k + e_k \qquad E(e_k) = 0 \qquad k = U, R$$

where X_k is a vector of explanatory variables, β_k includes the parameters associated with X_k, and e_k is the error term, which contains unobserved factors, we let $\hat{\beta}_k$ be a vector of the least-squares estimates for $\beta_k (k = U, R)$, obtained separately from the urban and rural samples and $\bar{X}_k$ be the estimate for $E(X_k)$. Then, the estimated urban-rural difference in mean per capita expenditure is expressed as twofold decomposition:

$$\hat{D} = \bar{Y}_U - \bar{Y}_R = (\bar{X}_U - \bar{X}_R)'\hat{\beta}^* + (\bar{X}_U'(\hat{\beta}_U - \hat{\beta}^*) + \bar{X}_R'(\hat{\beta}^* - \hat{\beta}_R))$$

where $\hat{\beta}^*$ is a vector of the least-squares estimates for the slope parameters and the intercept, which are obtained from the pooled sample of urban and rural households

4) As for the history, implementation method and problems of NSS, see Mukhopadhaya *et al.* (2011) and Tsujita (2006).

5) Poverty lines in 2011/12 were calculated using only Tendulkar methodology, and those in 1999/2000 were only Lakdawala methodology. However, poverty lines in 2004/05 were calculated using both methodologies. Due to this, based on poverty lines in 2011/12, those in 1999/2000 are adjusted by connecting both series in 2004/05.

6) For a comprehensive review of the Blinder-Oaxaca decomposition method and its applications, please see Jann (2008).

(Neumark, 1988). The first term in the above equation is the part of the urban-rural difference in mean per capita expenditure that is explained by urban-rural differences in the explanatory variables (endowments or quantity effect) and the second term is the unexplained part. Based on the above equation, this study decomposes difference in mean per capita household expenditure between urban and rural areas into several components, including educational differences.

3. Urban-Rural Disparity in Indonesia, the Philippines and India: Overview

Tables 2, 4, and 6 present figures on mean monthly per capita household expenditure and the shares of population and expenditure in Indonesia, the Philippines, and India, respectively, by urban and rural areas, and educational attainment, at two time points. Tables 3, 5, and 7 report the results of urban-rural decomposition of per capita expenditure inequality, by using the Theil *T*, in each of those three countries at two time points.

Table 2 Mean per capita Household Expenditure and the Shares of Population and Expenditure by Groups: Indonesia

	2008			2010		
	Mean per capita Expenditure[1)]	Population Share %	Expenditure Share %	Mean per capita Expenditure[1)]	Population Share %	Expenditure Share %
Urban and Rural Areas						
Urban	510,191	47.1	60.3	571,949	47.1	60.5
Rural	298,795	52.9	39.7	331,722	52.9	39.5
Total	398,390	100.0	100.0	444,802	100.0	100.0
Educational Atainment in Urban and Rural Areas[2)]						
Urban						
No Education	330,823	20.5	13.3	372,462	20.5	13.4
Primary	384,322	22.8	17.2	428,090	23.5	17.6
Lower Secondary	462,898	15.2	13.7	501,139	15.1	13.2
Upper Secondary	585,135	30.3	34.8	663,559	29.9	34.6
Tertiary	956,729	11.2	21.0	1,097,547	11.0	21.2
Total	510,191	100.0	100.0	571,949	100.0	100.0
Rural						
No Education	258,143	41.6	36.0	286,206	40.4	34.8
Primary	284,482	33.3	31.7	312,083	34.5	32.5
Lower Secondary	328,159	11.5	12.6	365,641	11.5	12.7
Upper Secondary	402,351	10.9	14.6	448,411	10.8	14.5
Tertiary	557,075	2.7	5.1	637,377	2.8	5.5
Total	298,795	100.0	100.0	331,722	100.0	100.0

Notes: 1) The average monthly per capita household consumption expenditure for each group at 2008 constant prices (Indonesian Rupiah).
2) Classified based on educational attainment level of household head.
Source: Calculated based on *Susenas* 2008 and 2010 .

Table 3 Inequality Decomposition by Urban and Rural Areas: Indonesia

	2008			2010		
	Theil *T*		Gini	Theil *T*		Gini
	Value	Contribution %[1]		value	Contribution %[1]	
Urban and Rural Areas						
Urban	0.242	57.8	0.361	0.264	60.0	0.377
Rural	0.180	28.3	0.300	0.177	26.3	0.313
Within-Area (A)	0.218	86.1		0.230	86.3	
Between-Area (B)[2]	0.035	13.9		0.036	13.7	
Total(C)=(A)+(B)	0.253	100.0	0.362	0.266	100.0	0.376
Between-Area (B')[3]	0.035	28.5		0.036	26.8	
Max Between-Area[4]	0.123	100.0		0.136	100.0	

Notes: 1) The percentage contribution of each inequality component to overall inequality.
2) Between-area inequality is assessed by using a conventional approach (see note 7).
3) Between-area inequality is assessed by using an alternative approach (see note 7).
4) This is obtained as the maximum between-area inequality attainable given the numbers and relative sizes of the groups (see note 7).
Source: Calculated based on *Susenas* 2008 and 2010 .

Table 2 indicates that, in Indonesia, mean expenditure per capita in urban areas is 1.7 times higher than that in rural areas. While the majority of the country's population resides in rural areas, urban areas occupy a larger share of expenditure, or around 60 percent. In both urban and rural areas, mean per capita household expenditure increases as the level of education that household heads have attained rises. However, there is a striking contrast between urban and rural areas in educational attainment level. The proportion of households whose heads have received higher education is considerably larger in urban areas than in rural areas. More than 40 percent of rural households are headed by those with no schooling or incomplete primary school.

Table 3 presents the result of urban-rural decomposition of per capita expenditure inequality in Indonesia. These figures indicate an upward trend in inequality in Indonesia as a whole over the period. Inequality within urban and rural areas is more significant than inequality between urban and rural areas, in terms of both value and contribution measured by the Theil *T*. Urban areas have a significantly higher within-group inequality than rural areas.

Clearly, between-area inequality is inconspicuous in comparison with within-area inequality. However, an alternative Theil index decomposition proposed by Elbers *et al.* (Between-area (B') in Table 3) indicates that observed inequality between the two areas accounts for more than 26 percent of the maximum attainable between-area inequality given the current distribution of per capita household expenditures, the relative sizes of urban and rural areas, and their ranking in terms of mean per capita expenditure.[7] This

7) Elbers *et al.* (2008) propose an alternative measurement approach for the contribution of the

implies a possibility that the contribution of urban-rural inequality is larger than we thought it was when based on the conventional Theil decomposition approach.

In the Philippines indicated in Table 4, urban areas have higher mean household expenditure per capita than rural areas in 1997 and 2006. The figures suggest the reduction of urban-rural inequality in mean expenditure per capita over these ten years, but mean expenditure per capita in urban areas is more than twice as large as that in rural areas in 2006. While more than half of the country's population resides in rural areas, urban areas account for around two-thirds of consumption expenditure. Mean expenditure per capita increases monotonically with education of the household heads in both urban and rural areas. However, the educational attainment level of household heads is very different between urban and rural areas. The proportion of households whose heads have received higher education is significantly larger in urban areas than in rural areas.

In Table 5, over the period, inequality in mean expenditure per capita in the Philippines as a whole has improved, but still remained at a high level. Inequality within urban and rural areas is more significant than inequality between urban and rural areas, judging from both value and contribution measured by the Theil *T*. Looking within urban and rural areas, urban inequality is considerably higher than rural inequality.

Urban-rural inequality accounts for a little less than 20 percent of overall inequality. When using the alternative Theil index decomposition method, inequality between urban and rural areas can explain around 40 percent of overall inequality. This suggests that urban-rural inequality in the Philippines is in severe situation.

Table 6 illustrates mean per capita household expenditure and the shares of population and expenditure in India in 1999/2000 and 2011/12. Urban areas have higher mean expenditure per capita than rural areas. The shares of population and expenditure are larger in rural areas than in urban areas. Although the center of the country in terms of the size and share of population is still on rural areas, the shares of population and consumption expenditure have been shifting from rural to urban areas over the period. This implies the advancement of dynamic urbanization and the expansion of inequality between urban and rural areas in India.

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between-group inequality component. The between-group component depends on the number of groups, the relative sizes of the groups and differences in mean per capita expenditures among the groups. Therefore, care should be taken to compare decomposition results based on different spatial groupings (Shorrocks and Wan, 2005). Even when the same spatial grouping is used, decomposition results would not be comparable if the relative sizes of the groups are different. To rectify the problem, Elbers *et al.* (2008) suggest that between-group inequality should be assessed against the maximum between-group inequality attainable given the number and relative sizes of the groups, rather than against the overall inequality that is used in the conventional approach for the contribution of the between-group inequality component.

Table 4 Mean per capita Household Expenditure and the Shares of Population and Expenditure by Groups: The Philippines

	1997			2006		
	Mean per capita Expenditure[1)]	Population Share %	Expenditure Share %	Mean per capita Expenditure[1)]	Population Share %	Expenditure Share %
Urban and Rural Areas						
Urban	31,248	47.6	67.9	48,535	49.6	67.8
Rural	13,417	52.4	32.1	22,633	50.4	32.2
Total	21,898	100.0	100.0	35,477	100.0	100.0
Educational Atainment in Urban and Rural Areas[2)]						
Urban						
No Education	17,167	15.6	8.6	27,607	14.2	8.0
Primary	19,602	18.5	11.6	30,676	14.1	8.9
Lower Secondary	21,170	11.3	7.6	33,836	12.2	8.5
Upper Secondary	30,844	39.8	39.3	47,764	43.4	42.8
Tertiary	69,510	14.8	32.9	95,837	16.1	31.8
Total	31,248	100.0	100.0	48,535	100.0	100.0
Rural						
No Education	10,736	38.3	30.7	16,510	35.1	25.6
Primary	12,140	27.9	25.2	19,271	23.5	20.1
Lower Secondary	12,729	10.8	10.2	20,817	12.5	11.5
Upper Secondary	17,243	19.5	25.1	28,079	23.9	29.6
Tertiary	33,620	3.5	8.8	60,158	5.0	13.2
Total	13,417	100.0	100.0	22,633	100.0	100.0

Notes: 1) The average monthly per capita household consumption expenditure for each group at 2000 constant prices (Philippine Peso).
2) Classified based on educational attainment level of household head.
Source: Calculated based on *FIES* 1997 and 2006.

Table 5 Inequality Decomposition by Urban and Rural Areas: The Philippines

	1997			2006		
	Theil *T*		Gini	Theil *T*		Gini
	Value	Contribution %[1)]		value	Contribution %[1)]	
Urban and Rural Areas						
Urban	0.453	65.0	0.456	0.343	59.5	0.427
Rural	0.253	17.2	0.368	0.281	23.1	0.387
Within-Area (A)	0.389	82.2		0.323	82.6	
Between-Area (B)[2)]	0.084	17.8		0.068	17.4	
Total (C) = (A) + (B)	0.473	100.0	0.470	0.391	100.0	0.455
Between-Area (B')[3)]	0.084	40.2		0.068	37.5	
Max Between-Area[4)]	0.209	100.0		0.182	100.0	

Notes: 1) The percentage contribution of each inequality component to overall inequality.
2) Between-area inequality is assessed by using a conventional approach (see note 7).
3) Between-area inequality is assessed by using an alternative approach (see note 7).
4) This is obtained as the maximum between-area inequality attainable given the numbers and relative sizes of the groups (see note 7).
Source: Calculated based on *FIES* 1997 and 2006.

Mean per capita household expenditure increases monotonically with education of the household heads in both urban and rural areas. However, mean per capita household expenditure is higher in urban areas than in rural areas even in the same educational attainment level, and such a tendency appears clearly in the groups of higher educated people. Also, the proportion of households whose heads have received higher education is considerably larger in urban areas than in rural areas.

Table 7 presents the result of urban-rural decomposition of per capita expenditure inequality in India in 1999/2000 and 2011/12. These figures show an upward trend in inequality in India as a whole during the period. In India, similar to the other two countries, inequality within urban and rural areas is more salient than inequality between urban and rural areas, in terms of both value and contribution measured by the Theil *T*. Also, urban areas have a higher within-group inequality than rural areas.

Over the observation period, as measured by the Theil *T*, the value of between-area inequality rises to 0.035 and its contribution to total inequality increases to 14 percent. In addition, an alternative decomposition measure indicates that inequality between urban and rural areas accounts for nearly one-fourth of the maximum attainable between-area inequality in 2011/12. India should also tackle inequality between urban and rural areas seriously.

As described earlier, in the three observed countries of Indonesia, the Philippines and India, urban areas have higher mean household expenditure per capita than rural areas. While the centers of those three countries in terms of population are still on rural areas, population and consumption expenditure have been flowing into urban areas.

Common to these three countries, in both urban and rural areas, mean per capita household expenditure increases as the level of education that household heads have attained rises. However, mean per capita household expenditure is higher in urban areas than in rural areas even in the same educational attainment level, and such a tendency becomes clear in the groups of higher educated people. Also, the proportion of households whose heads have received higher education is larger in urban areas than in rural areas.

As measured by the Theil *T*, in Indonesia and India, overall inequality in per capita household expenditure increases between two time points. In the Philippines, inequality in mean expenditure per capita has been slightly reduced, but still remained at a high level. When using the conventional Theil index decomposition method, the share of inequality between urban and rural areas is relatively lower than that of inequality within urban and rural areas. However, when using the alternative Theil index decomposition, the share of inequality between urban and rural areas increases substantially in Indonesia, the Philippines and India.

This suggests that the gaps between urban and rural areas are not necessarily small enough to ignore their impact. Our study pays attention to and examines the role of educational differences in urban-rural inequality in these three countries.

Table 6 Mean per capita Household Expenditure and the Shares of Population and Expenditure by Groups: India

	1999/2000			2011/12		
	Mean per capita Expenditure[1]	Population Share %	Expenditure Share %	Mean per capita Expenditure[1]	Population Share %	Expenditure Share %
Urban and Rural Areas						
Urban	2,236	27.2	36.9	3,205	31.3	43.8
Rural	1,430	72.8	63.1	1,873	68.7	56.2
Total	1,649	100.0	100.0	2,290	100.0	100.0
Educational Atainment in Urban and Rural Areas[2]						
Urban						
No Education	1,524	31.6	21.6	1,890	23.7	14.0
Primary	1,764	11.6	9.1	2,261	10.8	7.6
Lower Secondary	1,897	14.2	12.0	2,469	14.5	11.1
Upper Secondary	2,534	26.0	29.5	3,414	30.4	32.4
Tertiary	3,740	16.6	27.8	5,421	20.6	34.9
Total	2,236	100.0	100.0	3,205	100.0	100.0
Rural						
No Education	1,271	65.1	57.9	1,610	52.7	45.2
Primary	1,486	11.4	11.8	1,802	13.2	12.7
Lower Secondary	1,605	11.1	12.5	1,982	15.1	16.0
Upper Secondary	1,946	9.9	13.5	2,390	15.4	19.7
Tertiary	2,456	2.5	4.3	3,292	3.6	6.4
Total	1,430	100.0	100.0	1,873	100.0	100.0

Notes: 1) The average monthly per capita household consumption expenditure for each group at 2011/12 constant prices (Indian Rupee).
2) Classified based on educational attainment level of household head.
Source: Calculated based on *NSS* 1999/2000 and 2011/12.

Table 7 Inequality Decomposition by Urban and Rural Areas: India

	1999/2000			2011/12		
	Theil *T*		Gini	Theil *T*		Gini
	Value	Contribution %[1]		value	Contribution %[1]	
Urban and Rural Areas						
Urban	0.258	46.4	0.354	0.275	49.0	0.385
Rural	0.139	42.7	0.270	0.162	37.0	0.285
Within-Area (A)	0.183	89.1		0.211	86.0	
Between-Area (B)[2]	0.022	10.9		0.035	14.0	
Total (C) = (A) + (B)	0.205	100.0	0.317	0.246	100.0	0.351
Between-Area (B')[3]	0.022	19.2		0.035	24.0	
Max Between-Area[4]	0.116	100.0		0.143	100.0	

Notes: 1) The percentage contribution of each inequality component to overall inequality.
2) Between-area inequality is assessed by using a conventional approach (see note 7).
3) Between-area inequality is assessed by using an alternative approach (see note 7).
4) This is obtained as the maximum between-area inequality attainable given the numbers and relative sizes of the groups (see note 7).
Source: Calculated based on *NSS* 1999/2000 and 2011/12.

4. Accounting for Urban-Rural Disparity in Indonesia, the Philippines and India: the Blinder-Oaxaca Decomposition Method

The preceding section has provided an overview of the existence of urban-rural inequality in consumption expenditure in each of the three countries (Indonesia, the Philippines and India). Previous studies on inequality in Asian economies point out that household income or expenditure disparities are generated by unequal access to education.[8)] This section thus analyzes the degree of the impact of various household characteristics including educational differences on urban-rural inequality in per capita consumption expenditure, using the Blinder-Oaxaca decomposition method.

Specifically, this study decomposes differences in mean per capita household expenditure between urban and rural areas into the following common components of household features as the determinants of the urban-rural inequality in each of the three countries:

(i) household size;
(ii) gender of household head (female = 0; male = 1);
(iii) age of household head;
(iv) square of age of household head;
(v) years of education of household head; and
(vi) job sector of household head (agriculture/mining = 0; non-agriculture/mining = 1).

Note that the above variable (v), the number of years of education, is calculated according to the following, in each of the three countries.

In Indonesia, years of education of household head are calculated as: 1) no schooling (0 years); 2) incomplete primary school (3 years); 3) general and Islamic primary schools (6 years); 4) general and Islamic junior high schools (9 years); 5) general, Islamic and vocational senior high schools (12 years); 6) diploma I and II (13 years); 7) diploma III (15 years); 8) diploma IV (bachelor's degree) (16 years); and 9) master's or doctoral degree (18 years).

In case of the Philippines, the length of education is calculated as: 1) no schooling (0 years); 2) incomplete elementary education (3 years); 3) elementary education (6 years); 4) incomplete secondary education (8 years); 5) secondary education (10 years); 6) incomplete tertiary education (12 years); and 7) tertiary education including postgraduate education (14 years).

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8) Studies that associate inequality with household features including education are, for example, ADB (2007), ADB (2012), and OECD (2011).

As for India, based on Cain *et al.* (2008), the number of years of education is calculated in the following way: 1) illiterate (0 years); 2) literate through non-formal schooling (i.e., NFEC (Non-Formal Education Courses), ALC (Adult Literacy Centers), EGS (Education Guarantee Scheme), TLC (Total Literacy Campaign), and others) (1 year); 3) literate, but incomplete primary education (3 years); 4) primary education (5 years); 5) middle schools/lower secondary education (8 years); 6) secondary education (10 years); 7) higher secondary education (12 years); 8) diploma/certificate courses (12 years); 9) undergraduate education (15 years); and 10) postgraduate education (17 years). For the details of education system in India, refer to NSSO (2015).

Tables 8, 9 and 10 indicate the results of the Blinder-Oaxaca decomposition of urban-rural differences in mean per capita expenditure in Indonesia, the Philippines and India, respectively, at two time points.

Table 8 shows that, in Indonesia, the mean of the natural log of per capita expenditure in 2008 is 12.973 for urban households and 12.482 for rural households, yielding an urban-rural expenditure gap of 0.492. These figures in 2010 are almost at the same level as those in 2008. The Blinder-Oaxaca decomposition method can divide this expenditure gap into two parts. The first part, that is, the explained part (endowments or quantity effect), reflects the increase in mean per capita expenditure if rural households had the same endowments as urban households, assuming that urban and rural households have the same coefficients, obtained from the pooled sample of urban and rural households. The second part is a residual or unexplained part that captures all potential effects of

Table 8 Blinder-Oaxaca Decomposition of Urban-Rural Differences in Mean per capita Household Consumption Expenditure: Indonesia

	2008			2010		
	Coefficient	Z-score[1)]	Contribution %[2)]	Coefficient	Z-score[1)]	Contribution %[2)]
Prediction (Urban)	12.973	3,214.93		13.071	3,072.85	
Prediction (Rural)	12.482	4,660.70		12.574	4,413.63	
Difference (Urban-Rural)	0.492	101.54	100.0	0.496	96.97	100.0
Explained	0.226	68.04***	46.0	0.239	67.37***	48.2
Household Size	−0.008	−6.82***	−1.7	−0.012	−8.80***	−2.4
Gender of Household Head	0.000	1.49	0.0	0.000	1.81*	0.0
Age of Household Head	−0.017	−6.76***	−3.5	−0.007	−2.31**	−1.4
Square of Age of Household Head	0.015	6.94***	3.0	0.008	3.25***	1.6
Years of Education of Household Head	0.175	65.12***	35.5	0.181	64.76***	36.5
Household Job Sector (Agriculture vs. non-Agriculture)	0.062	27.38***	12.7	0.069	28.70***	13.9
Unexplained	0.265	55.79***	54.0	0.257	51.02***	51.8

Notes: 1) Z-score is used here as a test of statistical significance for coefficient. ***, **, and * indicate significant at the 1%, 5%, and 10% level, respectively.
2) The percentage contribution of each factor to the urban-rural expenditure gap.
Source: Calculated based on *Susenas* 2008 and 2010 .

Table 9 Blinder-Oaxaca Decomposition of Urban-Rural Differences in Mean per capita Household Consumption Expenditure: The Philippines

	1997			2006		
	Coefficient	Z-score[1)]	Contribution %[2)]	Coefficient	Z-score[1)]	Contribution %[2)]
Prediction (Urban)	9.896	1,992.13		10.445	1,803.37	
Prediction (Rural)	9.278	1,890.18		9.768	2,211.66	
Difference (Urban-Rural)	0.617	88.40	100.0	0.676	92.88	100.0
Explained	0.341	63.17***	55.2	0.322	61.72***	47.6
Household Size	0.003	1.24	0.5	0.008	3.12***	1.2
Gender of Household Head	0.003	5.01***	0.4	0.005	7.69***	0.7
Age of Household Head	0	0.04	0	−0.014	−4.49***	−2.1
Square of Age of Household Head	0.002	0.62	0.3	0.009	4.15***	1.3
Years of Education of Household Head	0.201	53.92***	32.6	0.206	55.24***	30.4
Household Job Sector (Agriculture vs. non-Agriculture)	0.132	38.45***	21.4	0.109	41.56***	16.1
Unexplained	0.276	42.44***	44.8	0.354	55.49***	52.4

Notes: 1) Z-score is used here as a test of statistical significance for coefficient. *** indicates significant at the 1 % level.
2) The percentage contribution of each factor to the urban-rural expenditure gap.
Source: Calculated based on *FIES* 1997 and 2006.

Table 10 Blinder-Oaxaca Decomposition of Urban-Rural Differences in Mean per capita Household Consumption Expenditure: India

	1999/2000			2011/12		
	Coefficient	Z-score[1)]	Contribution %[2)]	Coefficient	Z-score[1)]	Contribution %[2)]
Prediction (Urban)	7.535	2,789.05		7.748	2,418.94	
Prediction (Rural)	7.203	3,931.81		7.508	3,615.17	
Difference (Urban-Rural)	0.332	101.70	100.0	0.240	62.79	100.0
Explained	0.262	95.05***	79.0	0.164	67.43***	68.4
Household Size	0.042	38.75***	12.5	0.044	34.19***	18.3
Gender of Household Head	0.000	3.00***	0.1	0.001	5.84***	0.3
Age of Household Head	−0.010	−10.30***	−3.1	−0.008	−7.75***	−3.1
Square of Age of Household Head	0.001	1.13	0.3	0.000	0.45	0.1
Years of Education of Household Head	0.195	105.39***	58.6	0.128	71.92***	53.6
Household Job Sector (Agriculture vs. non-Agriculture)	0.035	17.71***	10.6	−0.002	−1.62	−0.8
Unexplained	0.070	20.52***	21.0	0.076	22.41***	31.6

Notes: 1) Z-score is used here as a test of statistical significance for coefficient. *** indicates significant at the 1% level.
2) The percentage contribution of each factor to the urban-rural expenditure gap.
Source: Calculated based on *NSS* 1999/2000 and 2011/12.

differences in unobserved variables. In the table, the increases of 0.226 in 2008 and 0.239 in 2010 indicate that differences in endowments (household size, gender, age, education and job sector) as a whole account for 46 and 48 percent, respectively, of the urban-rural expenditure gap.[9)]

In the explained part, the components related to household size, gender and age have only a marginal role. However, most significant is the education component, which is followed by the job sector component. Educational differences measured by the length of education of the household head are the largest contributor to differences in mean per capita expenditure between urban and rural areas. This education component accounts for approximately 36 percent of the urban-rural expenditure gap. Differences in job sector also explain 13–14 percent of the gap. Non-agricultural jobs or off-farm opportunities in rural areas would have an effect on reducing the gap between urban and rural areas. This result suggests that urban-rural disparity is largely associated with educational attainments and job sectors.

Table 9 exhibits the result of decomposition of urban-rural differences in mean per capita household expenditure in the Philippines. The mean of the natural log of per capita expenditure in 1997 is 9.896 for urban households and 9.278 for rural households, yielding an urban-rural expenditure gap of 0.617. These levels in 2006 are not much different from those in 1997. The increases of 0.341 in 1997 and 0.322 in 2006 show that differences in endowments (household size, gender, age, education and job sector) as a whole account for 55 and 48 percent, respectively, of the urban-rural expenditure gap.

In the Philippines, similar to Indonesia, the components associated with household size, gender and age do not play a prominent role in the explained part. Most noticeable is the education component, which is followed by the job sector component. Educational differences measured by years of education of the household head have the largest

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9) The estimated urban-rural difference in mean per capita expenditure can also be decomposed into the three terms as follows (threefold decomposition):

$$\hat{D} = \bar{Y}_U - \bar{Y}_R = (\bar{X}_U - \bar{X}_R)'\hat{\beta}_R + \bar{X}_R'(\hat{\beta}_U - \hat{\beta}_R) + (\bar{X}_U - \bar{X}_R)'(\hat{\beta}_U - \hat{\beta}_R) \text{ or}$$
$$\hat{D} = \bar{Y}_U - \bar{Y}_R = (\bar{X}_U - \bar{X}_R)'\hat{\beta}_U + \bar{X}_U'(\hat{\beta}_U - \hat{\beta}_R) - (\bar{X}_U - \bar{X}_R)'(\hat{\beta}_U - \hat{\beta}_R)$$

The first term reflects the mean increase in rural households' per capita expenditures if they had the same characteristics as urban households (endowments effect), while the second term presents the increase in rural households' per capita expenditures when applying the urban households' coefficients to the rural households' characteristics. The third component is the interaction term. Differences in endowments as a whole account for 37 percent of the urban-rural expenditure gap, while differences in coefficients account for 39 percent in 2008. As in the result in this paper based on the twofold decomposition, differences in educational attainments and job type play an important role in the urban-rural gap. In case of the Philippines and India, similar results are obtained when using the threefold decomposition.

influence to differences in mean per capita household expenditure between urban and rural areas. This education component accounts for approximately 30–33 percent of the urban-rural expenditure gap. Differences in job sector also explain around 16–21 percent of the gap. This result implies that educational attainments and job sectors have a large impact on urban-rural disparity in the Philippines.

According to Table 10, the mean of the natural log of per capita expenditure in India in 1999/2000 is 7.535 for urban households and 7.203 for rural households, yielding an urban-rural expenditure gap of 0.332. Likewise, that in 2011/12 is 7.748 for urban households and 7.508 for rural households, yielding an urban-rural expenditure gap of 0.240. The increases of 0.262 in 1999/2000 and 0.164 in 2011/12 demonstrate that differences in endowments (household size, gender, age, education and job sector) as a whole account for around 79 and 68 percent, respectively, of the urban-rural expenditure gap.

In India, while the components in relation to gender and age do not play a major role in the explained part, the education component is most influential. Similar to the other two countries, educational differences measured by the length of education of the household head are the primary factor of differences in mean per capita expenditure between urban and rural areas. This education component accounts for approximately 54–59 percent of the urban-rural expenditure gap. Next to the education component, the household size and job sector component have a large effect on urban-rural inequality in India. However, the contribution of job sector to the urban-rural expenditure gap largely drops in 2011/12. This change could also be explained by a recent increase in non-agricultural jobs and off-farm business opportunities in rural areas.

The results of analysis in each of the three countries using the Blinder-Oaxaca decomposition method in this section suggest that educational attainments and job sectors among household features make a large contribution to differences in per capita consumption expenditure between urban and rural areas.

5. Conclusions

This study selects Indonesia, the Philippines and India from among Asian developing countries and, based on household survey data, examines the determinants of urban-rural disparity in per capita consumption expenditure in those three countries, with a focus on education, using the Blinder-Oaxaca decomposition method. The results of analysis and implications drawn from them are summarized as follows.

Indonesia, the Philippines and India have achieved a steady economic development, with an average annual growth rate in real GDP per capita of 3.8 percent, 2.8 percent and 5.1 percent, respectively, between 2000 and 2010. Among Asian countries, Indonesia, the Philippines and India are large countries, with their population of approximately 240 million, 94 million and 1.2 billion, respectively, in 2010.

In all these three countries, urban areas have higher mean per capita consumption expenditure than rural areas. The shares of population and consumption expenditure tend to shift from rural to urban areas over the period. Common to these three countries, mean per capita household consumption expenditure increases monotonically with education of the household heads in both urban and rural areas. However, the proportion of households whose heads have received higher education is considerably larger in urban areas than in rural areas.

In both Indonesia and India, inequality in per capita consumption expenditure measured by the Theil index tends to expand during the observation period. In the Philippines, inequality in per capita expenditure improves over the period, but the level of inequality still remains high. The share of inequality between urban and rural areas is relatively lower than that of inequality within urban and rural areas, due to the feature of the conventional Theil decomposition method. However, the gaps between urban and rural areas are not necessarily small enough to ignore their impact. Furthermore, when using Elbers' alternative decomposition approach as a supplementary tool for the conventional Theil decomposition method, the share of inequality between urban and rural areas substantially increases, in these three countries.

Thus, this study attempts to decompose differences in mean per capita consumption expenditure between urban and rural areas into several household features including education, using the Blinder-Oaxaca decomposition method. As a result, in Indonesia, the Philippines and India, differences in educational endowments appear to have been a key determinant of urban-rural disparity, by accounting for approximately 30–60 percent of the urban-rural expenditure gap. In addition, to a lesser extent, differences in job sectors (agricultural sector *vs* non-agricultural sector) also contribute to the expenditure gap. As indicated in Tables 2, 4 and 6, in these three countries, while the proportion of households whose heads have completed tertiary education is about 10–20 percent in urban areas, that is merely around 2–5 percent in rural areas. In rural areas, the share of population engaged in agriculture with low productivity and high risks is large. It can be assumed that the existence of differences between urban and rural areas in access to education and employment opportunities in industries with high productivity and value added would become a major factor causing the urban-rural disparity in household consumption expenditure.

As countermeasures, it seems that the expansion of education in quantity, improvement in agricultural productivity and the creation of employment opportunities in non-agricultural sector could contribute to the reduction of urban-rural disparity in per capita consumption expenditure in Indonesia, the Philippines and India. An important issue would be whether those three countries, in which more than 40 percent of household heads in rural areas have not received primary education and agriculture sector with low productivity is a key industry, can expand the provision of education

services to people in rural areas, create educational opportunities for them through social policy tools such as conditional cash transfer program, and enhance their income-earning capacity in either agricultural or non-agricultural sector.

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