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Abstract

The Philippines has been successful in reducing inequality over the last two decades. This study conducts a two-stage hierarchical inequality decomposition analysis by location and education to explore the determinants of declining expenditure inequality using the Family Income and Expenditure Survey. In the period 1997-2006, falling inequality among urban households with tertiary education is the dominant determinant by explaining 74% of declining overall inequality. In the period 2006-2018, falling disparity between urban and rural areas is the main determinant by explaining 42% of declining overall inequality. Falling inequality among urban households with tertiary education contributed also, but its contribution is 25%. Though expenditure inequality has declined, its level is still very high. To further reduce expenditure inequality, it is imperative to reduce inequality among households with tertiary education. It is also important to reduce inequality between education groups, particularly between households with tertiary education and those with lower education.

Key words: expenditure inequality, Philippines, hierarchical inequality decomposition, roles of education, urban and rural dimensions

JEL codes: I24, I25, O15, O18

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1. Introduction

The Philippines has been successful in reducing inequality over the last two decades. By the Gini coefficient, expenditure inequality has declined from 0.47 in 1997 to 0.40 in 2018.[1] The Theil indices exhibit a similar trend (from 0.47 to 0.30 by the Theil T and from 0.37 to 0.27 by the Theil L).[2] Why has expenditure inequality declined so rapidly? This study explores the determinants of declining expenditure inequality in the Philippines using the Family Income and Expenditure Survey (FIES) from 1997 to 2018 and seeks for policy options that could further reduce expenditure inequality.

The study focuses on education, because education is a major determinant of income and a positive relationship is likely to exist between inequality in educational attainment and income inequality (Knight and Sabot, 1983; Ram, 1989; Park, 1996; Chu, 2000; De Gregorio and Lee, 2002; Lin, 2007; Rodríguez-Pose and Tselios, 2009; Lee and Lee, 2018). Analyses are conducted in an urban and rural framework, because 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).

The study uses expenditure data rather than income data to measure inequality for the

[1] The Gini coefficient can be obtained by using the following formula.

$$G = \frac{1}{2N^2\mu}\sum_{i=1}^{N}\sum_{j=1}^{N}\left|y_i - y_j\right|,$$

where N is total number of households, y_i is per capita expenditure of household i, and $\mu = \frac{1}{N}\sum_{i=1}^{N} y_i$ is mean per capita expenditure.

[2] The Theil T and L indices can be obtained, respectively, by using the following formula.

$$T = \frac{1}{N}\sum_{i=1}^{N}\frac{y_i}{\mu}\ln\left(\frac{y_i}{\mu}\right) \text{ and } L = \frac{1}{N}\sum_{i=1}^{N}\ln\left(\frac{\mu}{y_i}\right),$$

It should be noted that the Theil index T is more sensitive to changes in higher income groups, while the Theil index L is more sensitive to changes in lower income groups. On the other hand, the Gini coefficient is more sensitive to changes in the middle income groups.

following reasons (Akita, Lukman and Yamada, 1999). First, in developing countries, expenditure data are more reliable than income data because households in higher income groups tend to underreport their incomes. Second, welfare levels are likely to be better stated by current expenditure than by current income. Note, however, that inequality is usually smaller when measured by expenditure than by income because higher income households tend to save a larger proportion of their incomes.

This study first analyzes levels and trends of inequality in per capita expenditure (hereafter, expenditure inequality) and inequality in the number of years of education that household head has obtained (hereafter, educational inequality).[3] It then performs a Blinder-Oaxaca decomposition analysis to examine the role of education in urban-rural expenditure disparity. Finally, it conducts a two-stage hierarchical inequality decomposition analysis by location and education to explore the determinants of changes in expenditure inequality.[4] In the two-stage hierarchical decomposition analysis, all households are first grouped into the urban and rural sectors and then households in each sector are classified into four education groups based on household head's educational attainment level. Thus, we can analyze expenditure inequality due to differences in educational attainment after controlling for the effects of urban-rural differences in educational endowments on inequality.

Note that to measure expenditure inequality, the Theil *T* (or Theil's entropy measure) is employed.[5] But, to measure educational inequality, the Gini coefficient is used because a

[3] Inequalities are estimated across households.

[4] Most previous studies that investigated the roles of location and education in income or expenditure inequality performed an ordinary inequality decomposition analysis. They include Glewwe (1986), Ching (1991), Tsakloglou (1993), Estudillo (1997), Akita, Lukman and Yamada (1999), Kanbur and Zhang (1999), Liu (2001), Mukhopadhaya (2003), Rao, Banerjee and Mukhopadhaya (2003), Motonishi (2006), and Tang and Petrie (2009). The findings of these studies show that location and education are major determinants of income or expenditure inequality by accounting for 10-30% and 20-40% of overall inequality, respectively.

[5] In this study, the Theil *L* (mean logarithmic deviation) is also used to perform a two-stage hierarchical inequality

household with no education is given 0 year of education, thus, it is not possible to calculate the Theil *T*. These inequality measures satisfy several desirable properties such as anonymity, mean independence, population-size independence and the Pigou-Dalton transfer principle (Anand, 1983). Moreover, the Theil *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 (Shorrocks, 1980).[6]

The Philippines belongs to the Association of South East Asian Nations (ASEAN). It is the world's second largest archipelagic country next to Indonesia with the population of 106.7 million. The country is diverse in terms of geography, natural resource endowments, ethnicity and culture; it comprises more than 7,000 islands and accommodates 110 ethnic groups. According to the World Bank, it is among the middle-income countries. The country grew relatively rapidly over the last two decades; but, due to its high population growth, its per capita GDP in 2018 at US$ 3,022 (2010 US dollars) was much smaller than the ASEAN average.

The Philippines has made steady progress in education.[7] Primary education's gross enrolment ratio (GER) has exceeded 100% since the early 1990s. At the secondary education level, the country raised its net enrolment ratio (NER) from 48.6% to 65.6% over the period 1998-2015, though among four ASEAN countries (Indonesia, Malaysia, the Philippines and Thailand), the country's NER was the smallest in 2015. Meanwhile, the GER of tertiary

decomposition analysis. But the result is similar to the one by the Theil *T* qualitatively and thus it is not reported in this paper.

[6] It is not possible to decompose the Gini coefficient in this way, because the residual term emerges if the distributions of education for population sub-groups overlap (Lambert and Aronson, 1993).

[7] In the Philippines before 2012, the formal education system consisted of preprimary, basic compulsory (six years of primary and four years of secondary education), post-secondary, technical and vocational, and tertiary education (bachelor's, master's and doctoral programs) (Di Gropello, 2011). However, with the passage of the Kindergarten Act of 2012 and Enhanced Basic Education Act of 2013, the basic compulsory education was reformed in 2013, in which kindergarten education was added and secondary education was expanded to 6 years (UNESCO, 2015).

education has increased from 27.5% in 1998 to 35.5% in 2017. But, compared to Indonesia, Malaysia and Thailand, the progress of tertiary education was slow. In 2017, the GER of tertiary education was the smallest among the four ASEAN countries, though it was the highest in 1998.

2. Literature Review

There have been a number of studies on the distribution of economic well-being in the Philippines. Most of them used data from the Family Income and Expenditure Survey (FIES); see for example, Ching (1991), Estudillo (1997), Balisacan and Pernia (2002), Balisacan and Fuwa (2003), Pernia (2008), and Seriño (2014). Among these studies, Ching (1991), Estudillo (1997) and Seriño (2014) analyzed the roles of location and education in income or expenditure inequality using the one-stage inequality decomposition method.[8]

Based on the 1985 round of the FIES, Ching (1991) examined the roles of location, education, age, gender and household size in income inequality using the Theil *T* and the variance of log income. Its decomposition analysis showed that income inequality across seven education groups (no education, incomplete and complete primary education, incomplete and complete secondary, and incomplete and complete tertiary education) was the largest contributor to overall income inequality by explaining 40% of overall inequality as measured by the Theil *T*. On the other hand, income inequality between Metropolitan Manila, urban and rural areas accounted for 27% of overall income inequality.

Based on the 1971, 1985 and 1991 rounds of the FIES, Estudillo (1997) analyzed the roles of location, education and age in income inequality using the variance of log income and the Theil *L* and *T*. By the inequality decomposition analysis, the author obtained results similar to

[8] In the one-stage inequality decomposition analysis, the roles of household attributes in income or expenditure inequality are examined one by one.

Ching (1991); the contribution of income disparity across the seven education groups was the largest accounting for 25-35% of overall income inequality by the Theil *T*. On the other hand, disparity between urban and rural areas contributed 15-20% of overall income inequality by the same index.[9]

Based on the 2000 and 2006 rounds of the FIES, Seriño (2014) analyzed the distribution of economic well-being in Eastern Visayas (one of the 17 administrative regions located in the middle of the Philippines with the population of 4.5 million) using the Theil *L* and *T*. Unlike Ching (1991) and Estudillo (1997), the study used expenditure rather than income data. The inequality decomposition analysis by the Theil *T* revealed that around 40% of the region's overall expenditure inequality was explained by inequality across the seven education groups, while around 10% was explained by disparity between urban and rural areas.

These three studies substantiated the important roles of location and education in determining inequality in the Philippines. But, they employed the one-stage inequality decomposition method to investigate the roles of location and education in inequality. By contrast, our study uses the two-stage hierarchical inequality decomposition method to examine the roles of location and education in expenditure inequality simultaneously and hierarchically.

3. Methods and The Data

3.1. Methods

Blinder-Oaxaca Decomposition of Urban-Rural Difference in Mean Per Capita Expenditure

We conduct a Blinder-Oaxaca decomposition analysis to examine the effect of educational endowments on expenditure disparity between the urban and rural sectors (Blinder 1973;

[9] Note that in Ching's study, the country was divided into three areas (Metropolitan Manila, urban and rural areas), while in Estudillo's study, it was divided into two areas (urban and rural areas); thus, the contribution of income inequality across household locations is larger in Ching's study than in Estudillo's study.

Oaxaca 1973). To obtain the Blinder-Oaxaca decomposition equation, consider the following linear regression model in the urban and rural sectors (k = 1 and 2, respectively):

$$y_k = \boldsymbol{X}_k'\boldsymbol{\beta}_k + e_k \qquad E(e_k) = 0,$$

where y_k, $\boldsymbol{X}_k$, $\boldsymbol{\beta}_k$ and e_k are the natural logarithm of per capita expenditure, independent variables, coefficients associated with the independent variables, and the error term, respectively.

We employ a twofold decomposition method proposed by Neumark (1988), where the estimated difference in mean per capita expenditure (in natural logarithm) between the urban and rural sectors, $\bar{y}_1 - \bar{y}_2$, is decomposed into the two components.

$$\bar{y}_1 - \bar{y}_2 = (\overline{\boldsymbol{X}}_1 - \overline{\boldsymbol{X}}_2)'\widehat{\boldsymbol{\beta}}^* + \left(\overline{\boldsymbol{X}}_1'(\widehat{\boldsymbol{\beta}}_1 - \widehat{\boldsymbol{\beta}}^*) + \overline{\boldsymbol{X}}_2'(\widehat{\boldsymbol{\beta}}^* - \widehat{\boldsymbol{\beta}}_2)\right) \quad . \qquad (1)$$

In equation (1), $\widehat{\boldsymbol{\beta}}_k$, $\widehat{\boldsymbol{\beta}}^*$ and $\overline{\boldsymbol{X}}_k$ denote the coefficients of independent variables estimated separately by the samples of urban and rural households, the coefficients of independent variables estimated by the pooled sample of urban and rural households, and estimated value of $E(\boldsymbol{X}_k)$, respectively. The first component shows urban-rural difference in mean per capita expenditure due to independent variables (explained part or endowment effects), while the second component presents the unexplained part.

We include the following independent variables: the number of years of education, household size, gender, age, age squared, unemployment and agriculture. Among these variables, gender, unemployment and agriculture are 0-1 dummy variables (gender = 1 if household head is female; unemployment = 1 if household head is unemployed; agriculture = 1 if household head is engaged in agricultural activities). These variables are supposed to

determine household income and thus household expenditure.[10]

Two-stage Hierarchical Decomposition of Expenditure Inequality by Location and Education

We conduct a two-stage hierarchical inequality decomposition analysis by location and education using the Theil *T* to investigate the roles of education in expenditure inequality in an urban-rural framework. In the analysis, all households are first grouped into the urban and rural sectors, and then, households in each sector are classified into four education groups (no or incomplete primary, primary, secondary, and tertiary education groups). In this framework, overall expenditure inequality can be measured by the Theil *T* as follows.

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

where y_{ijk}, Y, N and N_{ij} are per capita expenditure of household k in education group j of sector i, total per capita expenditure of all households, total number of households and total number of households in education group j of sector i, respectively.

Overall expenditure inequality given by equation (2) can be decomposed hierarchically into three components as follows (Akita and Miyata, 2013).

$$T = T_{BS} + T_{WSBG} + T_{WSWG} \quad (3)$$

$T_{BS} = \sum_{i=1}^{2}\left(\frac{Y_i}{Y}\right)\ln\left(\frac{Y_i/Y}{N_i/N}\right)$ is the between-sector inequality component (inequality between the urban and rural sectors) where Y_i and N_i are total per capita expenditure and total number of

[10] According to Mincer (1958) and Blau and Kahn (2017), education, gender, age (as a proxy for experience), employment status and occupation are supposed to determine wage income (main source of household income). Meanwhile, due to economies of scale, per capita expenditure is supposed to decrease with household size.

households in sector *i*, respectively. $T_{WSBG} = \sum_{i=1}^{2}\left(\frac{Y_i}{Y}\right)T_{BGi}$ is the within-sector between-group inequality component, where $T_{BGi} = \sum_{j=1}^{4}\left(\frac{Y_{ij}}{Y_i}\right)\ln\left(\frac{Y_{ij}/Y_i}{N_{ij}/N_i}\right)$ is inequality between four education groups in sector i. $T_{WSWG} = \sum_{i=1}^{2}\sum_{j=1}^{4}\left(\frac{Y_{ij}}{Y}\right)T_{ij}$ is the within-sector within-group inequality component, where $T_{ij} = \sum_{k=1}^{N_{ij}}\left(\frac{y_{ijk}}{Y_{ij}}\right)\ln\left(\frac{y_{ijk}/Y_{ij}}{1/N_{ij}}\right)$ is inequality within education group *j* of sector *i*.

Equation (3) is the two-stage hierarchical decomposition equation. As an alternative multivariate decomposition method, Tang and Petrie (2009) suggested the non-hierarchical inequality decomposition method, where overall inequality is decomposed simultaneously but non-hierarchically with respect to household attributes. In the context of location and education, overall inequality is decomposed non-hierarchically as follows.

$$T = T_{BS} + T_{BG} + T_{ISG} + T_{WSWG}. \quad (4)$$

$T_{BG} = \sum_{j=1}^{4}\left(\frac{Y_j}{Y}\right)\ln\left(\frac{Y_j/Y}{N_j/N}\right)$ is the between-group inequality component (inequality between four education groups), where Y_j and N_j are, respectively, total per capita expenditure and total number of households of education group *j*, while T_{ISG} is the location-education interaction term. Using equations (3) and (4), the interaction term is given by $T_{ISG} = T_{WSBG} - T_{BG}$. It indicates urban-rural differences in the role of education in expenditure inequality and can take a positive or negative value.

3.2. The Data

The Family Income and Expenditure Survey (FIES) has been undertaken by the National Statistical Office every three to six years since 1957 (Ching 1991). Our study uses the 1997,

2000, 2006, 2012 and 2018 rounds of the FIES. All of them are nation-wide household surveys covering all regions. Table 1 presents their sample sizes. As discussed before, households are classified into four education groups. The no or incomplete primary group includes households whose heads have no or incomplete primary education, while the primary group includes households whose heads have primary education. The secondary group includes households whose heads have incomplete secondary, secondary or upper secondary education, while the tertiary group includes households whose heads have technical and vocational education, bachelor's, master's or doctor's degrees. Table 1 also provides the distributions of households across four education groups in urban and rural areas, estimated using household sampling weights. The sample sizes are large enough to estimate expenditure inequalities by education groups in urban and rural areas.

Table 1

4. Empirical Results

This study first analyzes levels and trends of expenditure inequality and educational inequality. It then performs a Blinder-Oaxaca analysis to investigate the effect of educational endowments on expenditure disparity between the urban and rural sectors and conducts a two-stage hierarchical decomposition analysis to examine the roles of education in expenditure inequality in an urban-rural framework. Finally, the study explores the determinants of changes in expenditure inequality for two periods: 1997-2006 and 2006-2018.

4.1. Levels and Trends of Expenditure Inequality by the Theil Index *T*: Urban and Rural Dimensions

By the Theil *T*, overall expenditure inequality has declined substantially from 0.473 in 1997 to 0.391 in 2006, and then to 0.297 in 2018. Table 2 presents the result of a one-stage

inequality decomposition analysis by location (urban and rural sectors). There are four main factors that affect overall expenditure inequality: changes in urban-rural disparity, urban inequality, rural inequality and the share of urban households. In the period 1997-2006, urban inequality has decreased prominently from 0.453 to 0.343. Together with the increasing share of urban households (from 47.6% to 49.6%), this helped to reduce overall inequality. Falling urban-rural disparity also contributed to the reduction of overall inequality, but its contribution is not as much as that of falling urban inequality. On the other hand, rural expenditure inequality has risen in the period, but its effect on overall inequality is small.

Table 2

In the period 2006-2018, urban inequality has further declined to 0.274. Together with the increasing share of urban households (from 49.6% to 52.2%), this helped to reduce overall inequality. However, the main contributor to the reduction of overall inequality is falling disparity between the urban and rural sectors. By the Theil *T*, the urban-rural disparity has declined from 0.068 to 0.029 and its contribution to overall inequality has decreased from 17.4% to 9.7%. Rural inequality has also decreased, but its effect on overall inequality is not large. Its contribution to overall inequality has increased from 23.1% to 31.2%.

4.2. Levels and Trends of Educational Inequality by the Gini Coefficient

According to Ram (1990), who investigated the relationship between the level of educational attainment and educational inequality using a dataset of around 100 countries, there is an inverted-U shaped relationship between these two variables, that is, educational inequality first increases, attains the peak and then declines with educational expansion. Over the period 1997-2018, the secondary and tertiary education groups have expanded in both urban and rural areas in the Philippines (see Table 1); thus, average number of years of education has risen from

7.4 to 8.6. On the other hand, educational inequality, as measured by the Gini coefficient, has declined from 0.295 to 0.254.[11] In other words, educational expansion has been associated with falling educational inequality. This suggests that the country has already passed the peak value of the inverted-U shaped curve before the study period.

4.3. Roles of Education in Urban-Rural Expenditure Disparity, A Blinder-Oaxaca Decomposition Analysis

According to Table 2, urban-rural expend iture disparity has declined prominently from 0.084 to 0.029 in the period 1997-2018; its contribution to overall inequality has decreased from 17.8% to 9.7%. What is the role of education in the urban-rural expenditure disparity? To address this question, we conduct a Blinder-Oaxaca decomposition analysis. Table 3 presents the results of the analysis for selected years. Urban-rural difference in educational endowments has been a major determinant of urban-rural difference in mean per capita expenditure; it accounted for 30-35% of total expenditure difference.

On the other hand, average number of years of education has increased more rapidly in rural than in urban areas in the study period (from 6.1 to 7.6 in rural areas and from 8.8 to 9.6 in urban areas); thus, the ratio of average number of years of education in urban areas to that in rural areas has decreased from 1.45 to 1.26. By the Gini coefficient, urban-rural educational disparity has decreased from 0.092 to 0.057. These observations suggest that falling urban-rural expenditure disparity is due primarily to narrowing urban-rural educational gap.

Table 3

[11] In an urban and rural setting, the educational Gini coefficient can be calculated by the following formula.

$$G = \frac{1}{2N^2 e}\sum_{i=1}^{2}\sum_{j=1}^{2}\sum_{h=1}^{N_i}\sum_{k=1}^{N_j}\left|e_{ih} - e_{jk}\right|,$$

where e_{ih}, e, N and N_i are, respectively, the number of years of education of household h in sector i, mean years of education of all households, total number of households, and total number of households in sector i.

4.4. Roles of Education in Expenditure Inequalities, A Two-stage Hierarchical Decomposition of Expenditure Inequality by Location and Education

To examine the roles of education in overall expenditure inequality, we now conduct a two-stage hierarchical inequality decomposition analysis by location and education using the Theil index *T*. Table 4 provides the result for 1997, 2006 and 2018, where the contributions are all measured against overall inequality in %. On the other hand, Table 5 presents the result of a non-hierarchical inequality decomposition analysis together with that of the hierarchical inequality decomposition analysis. According to the non-hierarchical decomposition analysis, the interaction between location and education (T_{ISG}) accounts for 5-10% of overall inequality. This suggests that expenditure inequality resulting from differences in educational attainment is due partly to urban-rural differences in educational endowments and thus confirms the validity of our two-stage hierarchical inequality decomposition analysis by location and education.

Tables 4 and 5

Based on the result of the two-stage hierarchical decomposition analysis, Table 6 presents the determinants of changes in overall expenditure inequality for the periods 1997-2006 and 2006-2018. In the period 1997-2006, overall expenditure inequality has decreased from 0.473 to 0.381 (Table 4). It is apparent that falling inequality within urban sector's tertiary education group is the dominant determinant by accounting for 74.0% of declining overall inequality. In 1997, urban sector's tertiary education group registered a very high within-group inequality at 0.467. But, in 2006, it reduced its within-group inequality substantially to 0.294 (Table 4). Together with the expansion of the tertiary education group, this helped to reduce overall inequality.

Table 6

Falling expenditure disparity between the urban and rural sectors is another main determinant of declining overall inequality. In 1997, urban-rural disparity was 0.084, but fell to 0.068 in 2006 (Table 4). This accounted for 19.4% of the reduction of overall inequality (Table 6). As discussed before, narrowing educational gap between the urban and rural sectors seems to have reduced urban-rural expenditure disparity to some extent. By the Gini coefficient, urban-rural educational disparity has declined from 0.092 to 0.083 in the period.

Falling expenditure disparity between education groups in urban areas also contributed to the reduction of overall inequality. According to Table 4, mean per capita expenditure increases as the level of education rises in both urban and rural sectors. Particularly in urban areas, very large differences existed in mean per capita expenditure between the tertiary group and the other education groups in 1997; the expenditure ratios of the tertiary group to the secondary and primary groups were, respectively, 2.1 and 2.7. However, in 2006, these ratios have declined to 1.9 and 2.5. Falling expenditure disparity between education groups in urban areas accounted for 19.0% of the reduction of overall inequality (Table 6).

In the period 2006-2018, overall expenditure inequality has further declined to 0.297. Like in the previous period, falling inequality within urban sector's tertiary education group is an important determinant of declining overall inequality. But, its contribution is 24.8%, much smaller than that in the previous period 1997-2006 (Table 6). In this period, falling disparity between the urban and rural sectors is the main determinant by explaining 41.7% of declining overall inequality. In 2006, the ratio of mean per capita expenditure in the urban sector to that in the rural sector was 2.1, but it has declined prominently to 1.6 in 2018 (Table 4). We should note that narrowing educational gap between the urban and rural sectors seems to have reduced

urban-rural expenditure disparity to a considerable extent. By the Gini coefficient, urban-rural educational disparity has decreased notably from 0.083 to 0.057.

Falling expenditure inequality within urban sector's secondary education group is another contributor to the reduction of overall inequality. In 2006, urban sector's secondary group had a relatively high within-group inequality at 0.247; but, it fell substantially to 0.172 in 2018 (Table 4). Falling inequality within urban sector's secondary group together with the expansion of secondary education explained 15.2% of the reduction of overall inequality (Tables 1 and 6). Falling expenditure disparity between education groups in urban areas also contributed to the reduction of overall inequality. In urban areas, the expenditure ratios of the tertiary group to the secondary and primary groups were, respectively, 1.9 and 2.5 in 2006, but in 2018, these ratios have declined to 1.8 and 2.1 (Table 4). Falling expenditure disparity between education groups in urban areas accounted for 14.8% of the reduction of overall inequality (Table 6).

4.5. Characteristics of Urban Sector's Tertiary Education Group

Because urban sector's tertiary education group has played an important role in reducing overall expenditure inequality, we examine expenditure inequality within this group. If households in this group are classified into 10 decile groups (from the poorest to the richest), the richest decile group had a much larger within-group inequality than the other 9 groups. Therefore, we conduct an inequality decomposition analysis after classifying the households into two groups: the richest decile group and the other group. The result is presented in Table 7. In 1997, the richest group had a very high within-group expenditure inequality at 0.304 by the Theil *T*, much larger than the other group's inequality (0.140). This indicates that there were some exceptionally rich households in the richest decile group.

Table 7

What are the characteristics of these exceptionally rich households? Table 8 compares the richest 1% of households with the other households in urban sector's tertiary education group. Household heads of the richest 1% are more educated and older than those of the other households on average; around 90% of them have at least bachelor's degree and about half of them are more than 55 years old. Geographically, many of the richest 1% of households live in the National Capital Region (NCR). Particularly in 1997, 97% of them were in the NCR, much larger than the proportion for the other households (36%). In 1997, the mean per capita expenditure of the richest 1% was 14.3 times that of the other households. The richest 1% held 12.6% of total per capita expenditure in urban sector's tertiary group. These observations suggest that there was a large expenditure disparity between the richest 1% of households and the other households in 1997. By the Theil *T*, expenditure disparity between these two groups accounted for about 40% of total expenditure inequality in urban sector's tertiary group.

Table 8

Another interesting characteristic of the richest 1% of households in urban sector's tertiary education group is that they seem to have a large amount of physical assets (land and buildings). According to income data from the 1997 FIES, the proportion of income from physical assets (rental income) to total household income was very large at 14.5% for the richest 1%, much larger than that for the other households in urban sector's tertiary group (1.7%) (Table 8). Using rental income as a proxy for the amount of physical assets, we perform a multiple regression analysis to examine the relationship between household expenditure and the amount of assets, where the dependent variable is per capita expenditure, while independent variables are rental income, financial income (interest and dividend), location, household size, age, age squared, gender, and agriculture, where location, gender and agriculture are 0-1 dummy variables

(location =1 if household lives in the NCR; gender = 1 if household head is female; agriculture = 1 if household head is engaged in agricultural activities).[12] The result based on the sample of urban sector's tertiary education group is given in Table 9.

Table 9

In 1997, the coefficient of rental income is positive and significant at the 1% level, indicating that households with larger amounts of renal income tend to have larger per capita expenditure.[13] The coefficient of location is also positive and significant at the 1% level, indicating that households living in the NCR tend to have larger per capita expenditure. From these findings, the main reason why the richest 1% of households had a very large mean per capita expenditure in 1997 is that most of them lived in the NCR with large amounts of physical assets. Age seems to be another important factor, because the coefficient of age is positive and significant at the 5% level and household heads of the richest 1% were much older than those of the other households on average (Table 8).

In 2006, expenditure inequality within the richest decile group has declined substantially to 0.113 from 0.304 (Table 7). This apparently reduced expenditure inequality within urban sector's tertiary education group (from 0.467 to 0.294). In 2006, the proportion of renal income to total household income for the richest 1% of households has declined prominently to 2.1% (from 14.5%), whereas the proportion of the richest 1% living in the NCR has decreased to 66% (Table 8). This appears to have reduced expenditure disparity between the richest 1% and the other households in urban sector's tertiary group. By the Theil *T*, the expenditure disparity

[12] We do not include total household income as an independent variable to avoid the problem of endogeneity. Asset income, such as financial and rental incomes, may be endogenous (Strauss and Thomas, 1998). But, in this study, we do not seek for a causal relationship between asset income and per capita expenditure.

[13] Even if total household income is included as an independent variable, the coefficient of rental income is positive and significant at the 1% level. But, the coefficient of financial income becomes insignificant.

between these two groups accounted for about 25% of total inequality in urban sector's tertiary group. Note here that according to the regression analysis for 2006, the coefficients of rental income and NCR are positive and significant either at the 1% or 5% level (Table 9).

In the period 2006-2018, expenditure inequality within urban sector's tertiary education group has declined from 0.294 to 0.257 (Table 7). In contrast to the previous period, the main determinant was falling expenditure disparity between the richest decile group and the other households rather than falling inequality within the richest decile group, because it accounted for 60% of the reduction of expenditure inequality in urban sector's tertiary group. Inequality within the richest decile group has also decreased, but only slightly from 0.113 to 0.106 (Table 7). According to the regression analysis for 2018, the coefficients of rental income and NCR are positive and significant at the 1% level. In 2018, the proportion of the richest 1% of households living in the NCR has decreased to 57% from 66% (Table 8). This appears to have reduced expenditure inequality within the richest decile group though the proportion of rental income to total household income for the richest 1% has increased to 3.1%.

We should note that the proportion of financial income to total household income for the richest 1% of households was very large at 26.2% in 2018, much larger than that for the other households (0.9%). But, according to the regression analysis for 2018, the estimated coefficient of financial income was very small compared to that of rental income (0.02 against 0.31), though it is positive and significant at the 5% level (Table 9).[14] Thus, the effect of financial income on expenditure is small.

[14] Even if total household income is included as an independent variable, the coefficient of rental income is positive and significant at the 1% level. But, the coefficient of financial income becomes insignificant.

5. Conclusion

The Philippines has been very successful in reducing inequality over the last two decades. By the Gini coefficient, expenditure inequality has declined substantially from 0.47 in 1997 to 0.40 in 2018. This study conducted a two-stage hierarchical inequality decomposition analysis by location and education to explore the determinants of declining expenditure inequality using the Family Income and Expenditure Survey (FIES) from 1997 to 2018.

The major findings are summarized as follows. In the period 1997-2006, overall expenditure inequality has decreased from 0.47 to 0.39 by the Theil *T*. Falling expenditure inequality among urban households with tertiary education is the dominant determinant by accounting for 74% of declining overall inequality. In 1997, urban sector's tertiary education group registered a very high within-group inequality at 0.47, but in 2006, it reduced its within-group inequality substantially to 0.29. Together with the expansion of tertiary education, this helped to reduce overall inequality notably. Falling expenditure disparity between urban and rural areas is another main determinant by explaining 20% of falling overall inequality, where narrowing educational gap between urban and rural areas seems to have contributed to the reduction of urban-rural expenditure disparity.

In 1997, some exceptionally rich households existed in urban sector's tertiary group. The richest 1% of households held 12.6% of total per capita expenditure in urban sector's tertiary group, indicating that there was a large expenditure disparity between the richest 1% and the other households. Geographically, 97% of the richest 1% lived in the National Capital Region (NCR). Furthermore, for the richest 1%, the proportion of rental income to total household income was very large at 14.5% in 1997, much larger than that for the other households. The result of the regression analysis suggests that the main reason why the richest 1% of households

had a very large mean per capita expenditure in 1997 is that most of them lived in the NCR with large amounts of physical assets. In the period 1997-2006, the proportion of renal income to total household income for the richest 1% has declined notably from 14.5% to 2.1%, while the proportion of the richest 1% living in the NCR has decreased to 66%. These changes appear to have contributed to the substantial reduction of expenditure inequality among urban households with tertiary education.

In the period 2006-2018, overall expenditure inequality has further declined to 0.30 by the Theil *T*. Falling expenditure disparity between urban and rural areas is the main determinant by explaining 42% of declining overall inequality. In 2006, the ratio of mean per capita expenditure in urban areas to that in rural areas was 2.1, but it has declined prominently to 1.6 in 2018. Like in the previous period, narrowing educational gap between urban and rural areas seems to have contributed to the reduction of urban-rural expenditure disparity. Falling expenditure inequality among urban households with tertiary education contributed also to the reduction of overall inequality. But, its contribution is 25%, much smaller than that in the previous period. Falling expenditure inequality among urban households with secondary education is another determinant of declining overall inequality. In 2006, urban sector's secondary group had a relatively high within-group inequality at 0.25 by the Theil *T*. But, it fell substantially to 0.17 in 2018. Together with the expansion of secondary education, this contributed 15% of the reduction of overall inequality.

Though expenditure inequality has declined substantially over the last two decades, its level is still very high by international standards. An important policy question is whether expenditure inequality will further decline or not. Another important policy question is what will be the main determinants of expenditure inequality. With the expansion of higher education,

inequalities among households with secondary and tertiary education are likely to play an increasingly important role in determining expenditure inequality. Particularly, inequality among households with tertiary education is very high. In 2018, it accounted for 35% of overall inequality. It is thus imperative to reduce expenditure inequality among households with tertiary education. It is also important to reduce expenditure inequality between education groups, particularly between households with tertiary education and those with lower education. Note that in 2018, the mean per capita expenditure of households with tertiary education is more than two times that of households with primary education and 1.8 times that of households with secondary education.

While our study provides valuable insights into the roles of education in expenditure inequality, it is not without limitations. First, our Blinder-Oaxaca decomposition analysis may be subject to an endogeneity problem due to reverse causality between the dependent variable and years of education. In future research, we plan to address this issue by using instrumental variable techniques to improve the validity of our results. Second, we found that the tertiary education group had the highest expenditure inequality and played an important role in determining overall expenditure inequality. Thus, we plan to conduct further research to explore factors contributing to tertiary group's expenditure inequality and the expenditure disparity between the tertiary and other education groups. Third, our study did not adjust expenditure data for price differences between urban and rural areas. However, it is important to note that there is a significant disparity in the cost of living between these areas. Therefore, in our future research, we aim to convert nominal expenditures into real expenditures by utilizing regional price deflators before analyzing the roles of education in expenditure inequality.

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Data availability statement

The data that support the findings of this study are available from Philippine Statistics Authority. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from Takahiro Akita with the permission of Philippine Statistics Authority.

Table 1. Family Income and Expenditure Surveys

	Sample sizes			Distribution of households (%)		
	Urban	Rural	Total	Urban	Rural	Total
1997						
No or incomplete primary	3,980	6,265	10,245	15.6	38.3	27.5
Primary	4,503	4,212	8,715	18.6	27.9	23.4
Secondary	7,961	3,916	11,877	35.5	24.1	29.5
Tertiary	6,984	1,699	8,683	30.3	9.8	19.5
Total	23,428	16,092	39,520	100.0	100.0	100.0
2000						
No or incomplete primary	3,893	6,134	10,027	15.2	37.5	26.4
Primary	4,012	3,888	7,900	16.6	25.1	20.9
Secondary	8,398	4,298	12,696	36.7	26.9	31.7
Tertiary	7,221	1,771	8,992	31.5	10.5	20.9
Total	23,524	16,091	39,615	100.0	100.0	100.0
2006						
No or incomplete primary	2,548	7,573	10,121	14.1	35.1	24.7
Primary	2,440	4,911	7,351	14.1	23.6	18.9
Secondary	6,633	6,109	12,742	39.2	29.2	34.2
Tertiary	5,644	2,621	8,265	32.5	12.2	22.3
Total	17,265	21,214	38,479	100.0	100.0	100.0
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 household sampling weights.
(Source) Calculated based on FIES in 1997, 2000, 2006, 2012 and 2018.

Table 2. Decomposition of Expenditure Inequality by Location (Urban and Rural Sectors) by the Theil Index *T*

	Theil *T*	Contribution (%)	Expenditure Share (%)	Population share (%)
1997				
Total	0.473	100.0	100.0	100.0
Between-sector (B-sector)	0.084	17.8		
Within-sector (W-sector)	0.389	82.2		
Urban sector	0.453	65.0	67.9	47.6
Rural sector	0.253	17.2	32.1	52.5
2006				
Total	0.391	100.0	100.0	100.0
Between-sector (B-sector)	0.068	17.4		
Within-sector (W-sector)	0.323	82.6		
Urban sector	0.343	59.5	67.8	49.6
Rural sector	0.281	23.1	32.2	50.4
2018				
Total	0.297	100.0	100.0	100.0
Between-sector (B-sector)	0.029	9.7		
Within-sector (W-sector)	0.268	90.3		
Urban sector	0.274	59.0	64.1	52.2
Rural sector	0.258	31.2	35.9	47.8

(Source) Authors' calculation based on FIES in 1997, 2006 and 2018.

Table 3. Blinder-Oaxaca Decomposition Analysis

	Coefficient	Robust standard error	Z-value	Contribution (%)
1997				
Differential				
Prediction for urban sector	9.896	0.005	1992.1	
Prediction for rural sector	9.278	0.005	1890.2	
Difference (1) = (2) + (3)	0.617	0.007	88.4	100
Explained part (2)				
Years of education	0.216	0.004	55.6	35.0
Household size	0.003	0.002	1.2	0.5
Gender	0.003	0.001	4.8	0.4
Age	0.000	0.004	0.0	0.0
Age squared	0.002	0.003	0.6	0.3
Unemployment	0.002	0.001	1.9	0.3
Agriculture	0.101	0.003	33.1	16.4
Total	0.327	0.005	61.4	53.0
Unexplained part (3)				
Total	0.290	0.006	45.5	47.0
2006				
Differential				
Prediction for urban sector	10.445	0.006	1803.4	
Prediction for rural sector	9.768	0.004	2211.7	
Difference (1) = (2) + (3)	0.676	0.007	92.9	100
Explained part (2)				
Years of education	0.217	0.004	56.4	32.1
Household size	0.008	0.003	3.1	1.2
Gender	0.003	0.001	5.9	0.5
Age	-0.015	0.003	-4.5	-2.2
Age squared	0.010	0.002	4.2	1.4
Unemployment	0.009	0.001	9.6	1.4
Agriculture	0.102	0.003	39.6	15.1
Total	0.335	0.005	62.9	49.5
Unexplained part (3)				
Total	0.342	0.006	54.1	50.5
2018				
Differential				
Prediction for urban sector	10.930	0.003	4105.1	
Prediction for rural sector	10.469	0.002	4816.6	
Difference (1) = (2) + (3)	0.461	0.003	134.2	100
Explained part (2)				
Years of education	0.138	0.002	88.2	30.0
Household size	-0.001	0.001	-0.7	-0.2
Gender	0.002	0.000	7.6	0.4
Age	-0.026	0.002	-13.8	-5.6
Age squared	0.019	0.001	13.3	4.1
Unemployment	0.001	0.000	2.5	0.1
Agriculture	0.048	0.001	62.0	10.4
Total	0.180	0.002	75.5	39.1
Unexplained part (3)				
Total	0.281	0.003	101.9	60.9

(Source) Authors' calculation based on FIES in 1997, 2006 and 2018.

Table 4. Two-stage Hierarchical Decomposition of Expenditure Inequality by Location and Education by the Theil Index *T*

	Theil T	Contribution (%)	Mean per capita exp.		Theil T	Contribution (%)	Mean per capita exp.
1997							
Total (1) = (2)+ (3)	0.473	100.0	21,898				
B-sector (2)	0.084	17.8					
W-sector (3) = (a) + (d)	0.389	82.2					
Urban sector (a) = (b) + (c)	0.453	65.0	31,252	Rural sector (d) = (e) + (f)	0.253	17.2	13,417
B-group (b)	0.099	14.2		B-group (e)	0.041	2.8	
W-group (c)	0.354	50.9		W-group (f)	0.212	14.4	
No education	0.252	3.1	17,169	No education	0.196	4.1	10,736
Primary	0.231	3.9	19,604	Primary	0.206	3.5	12,141
Secondary	0.236	9.8	25,380	Secondary	0.204	3.6	14,271
Tertiary	0.467	34.1	52,520	Tertiary	0.258	3.3	25,465
2006							
Total (1) = (2)+ (3)	0.391	100.0	35,477				
B-sector (2)	0.068	17.4					
W-sector (3) = (a) + (d)	0.323	82.6					
Urban sector (a) = (b) + (c)	0.343	59.5	48,535	Rural sector (d) = (e) + (f)	0.281	23.1	22,633
B-group (b)	0.076	13.2		B-group (e)	0.064	5.3	
W-group (c)	0.267	46.3		W-group (f)	0.217	17.8	
No education	0.245	3.4	27,607	No education	0.184	3.9	16,510
Primary	0.208	3.2	30,676	Primary	0.191	3.1	19,271
Secondary	0.247	13.9	40,125	Secondary	0.213	5.2	23,281
Tertiary	0.294	25.8	75,538	Tertiary	0.278	5.6	45,233
2018							
Total (1) = (2)+ (3)	0.297	100.0	61,435				
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	75,435	Rural sector (d) = (e) + (f)	0.258	31.3	46,146
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 education	0.202	3.1	42,967	No education	0.166	3.7	32,135
Primary	0.185	3.7	53,693	Primary	0.171	3.8	38,821
Secondary	0.172	13.5	64,130	Secondary	0.189	7.9	44,775
Tertiary	0.257	26.1	113,261	Tertiary	0.264	9.3	81,337

(Note) Mean per capita expenditure is in Peso. B-sector and W-sector are between-sector and within-sector, respectively. B-group and W-group are between-group and within-group, respectively.

(Source) Authors' calculation based on FIES in 1997, 2006 and 2018.

Table 5. Hierarchical vs. Non-hierarchical Decomposition of Expenditure Inequality by the Theil index *T* (Location - Education)

	Hierarchical decomposition		Non-hierarchical decomposition	
	Value	Contribution (%)	Value	Contribution (%)
1997				
Total	0.473	100.0	0.473	100.0
B-sector (T_{BS}) (Location)	0.084	17.8	0.084	17.8
B-group (T_{BG}) (Education)			0.130	27.5
W-sector B-group (T_{WSBG})	0.080	17.0		
Interaction term (T_{ISG})			-0.050	-10.5
W-sector W-group (T_{WSWG})	0.309	65.3	0.309	65.3
No education	0.034	7.2	0.034	7.2
Primary education	0.035	7.4	0.035	7.4
Secondary education	0.063	13.3	0.063	13.3
Tertiary education	0.177	37.4	0.177	37.4
2006				
Total	0.391	100.0	0.391	100.0
B-sector (T_{BS}) (Location)	0.068	17.4	0.068	17.4
B-group (T_{BG}) (Education)			0.113	28.8
W-sector B-group (T_{WSBG})	0.072	18.4		
Interaction term (T_{ISG})			-0.041	-10.4
W-sector W-group (T_{WSWG})	0.251	64.2	0.251	64.2
No education	0.029	7.3	0.029	7.3
Primary education	0.025	6.4	0.025	6.4
Secondary education	0.075	19.2	0.075	19.2
Tertiary education	0.123	31.4	0.123	31.4
2018				
Total	0.297	100.0	0.297	100.0
B-sector (T_{BS}) (Location)	0.029	9.7	0.029	9.7
B-group (T_{BG}) (Education)			0.074	24.8
W-sector B-group (T_{WSBG})	0.057	19.3		
Interaction term (T_{ISG})			-0.016	-5.5
W-sector W-group (T_{WSWG})	0.211	71.0	0.211	71.0
No education	0.020	6.8	0.020	6.8
Primary education	0.022	7.5	0.022	7.5
Secondary education	0.063	21.4	0.063	21.4
Tertiary education	0.105	35.4	0.105	35.4

(Source) Authors' calculation based on FIES in 1997, 2006 and 2018.

Table 6. Changes in Expenditure Inequality based on Hierarchical Inequality Decomposition Analysis by the Theil *T*: 1997 – 2006 and 2006 – 2018

	Absolute changes (Theil index *T*)			Contributions (%)		
	Total	Urban	Rural	Total	Urban	Rural
1997 - 2006						
Total	-0.082			100.0		
B-sector (T_{BS})	-0.016			19.4		
W-sector B-group (T_{WSBG})	-0.008	-0.016	0.007	10.0	19.0	-9.0
W-sector W-group (T_{WSWG})						
No education	-0.005	-0.001	-0.004	6.7	1.6	5.1
Primary	-0.010	-0.006	-0.004	12.3	7.0	5.3
Secondary	0.012	0.008	0.004	-14.6	-10.1	-4.5
Tertiary	-0.054	-0.061	0.006	66.2	74.0	-7.8
2006 - 2018						
Total	-0.094			100.0		
B-sector (T_{BS})	-0.039			41.7		
W-sector B-group (T_{WSBG})	-0.015	-0.014	-0.001	15.6	14.8	0.8
W-sector W-group (T_{WSWG})						
No education	-0.008	-0.004	-0.004	8.9	4.4	4.5
Primary	-0.003	-0.002	-0.001	2.9	1.7	1.2
Secondary	-0.011	-0.014	0.003	12.2	15.2	-3.0
Tertiary	-0.018	-0.023	0.006	18.7	24.8	-6.1

(Source) Authors' calculation based on FIES in 1997, 2006 and 2018.

Table 7. Decomposition of Expenditure Inequality by Decile Groups in Urban Sector's Tertiary Education Group

	Theil T	Contribution (%)	Mean per capita expenditure	Expenditure share (%)
1997				
Total	0.467	100.0	52,520	100.0
Between richest and other decile groups	0.266	56.9		
Within decile groups	0.201	43.1		
Richest decile group	0.304	24.3	196,293	37.4
Other decile groups	0.140	18.8	36,548	62.6
2006				
Total	0.294	100.0	75,538	100.0
Between richest and other decile groups	0.165	56.0		
Within decile groups	0.129	44.0		
Richest decile group	0.113	11.8	232,837	30.8
Other decile groups	0.136	32.1	58,086	69.2
2018				
Total	0.257	100.0	113,261	100.0
Between richest and other decile groups	0.143	55.6		
Within decile groups	0.114	44.4		
Richest decile group	0.106	12.1	330,469	29.2
Other decile groups	0.117	32.4	89,130	70.8

(Source) Authors' calculation based on FIES in 1997, 2006 and 2018.

Table 8. Characteristics of Households in Urban Sector's Tertiary Education Group Comparison between the Richest 1% of Households and Other Households

	1997			2006			2018		
	Richest 1%	Others	Total	Richest 1%	Others	Total	Richest 1%	Others	Total
Region (%)									
NCR	96.9	35.9	36.5	65.5	31.9	32.2	56.6	30.5	30.8
Other regions	3.1	64.1	63.5	34.5	68.1	67.8	43.4	69.5	69.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean age	58.0	44.3	44.4	55.3	45.9	46.0	51.6	48.8	48.8
Mean years of education	13.9	13.0	13.0	13.9	13.0	13.0	14.3	13.8	13.8
Mean per capita exp. (Peso)	662,807	46,385	52,520	540,856	70,897	75,538	734,057	106,991	113,261
Expenditure share (%)	12.6	87.4	100	7.1	92.9	100	6.5	93.5	100
Proportion of rental income (%)	14.5	1.7	2.4	2.1	1.5	1.5	3.1	1.1	1.2
Proportion of financial income (%)	3.5	0.7	0.9	4.3	0.4	0.5	26.2	0.9	1.8

(Note) NCR is the National Capita Region (Manila region).
(Source) Authors' calculation based on FIES in 1997, 2006 and 2018.

Table 9. Multiple Regression Analysis: Exploring Factors of Household Expenditure among Urban Households with Tertiary Education

Dependent variable = per capita expenditure

	1997			2006			2018		
Variables	Coefficient		Robust STE	Coefficient		Robust STE	Coefficient		Robust STE
Rental income	0.411	***	0.087	0.270	**	0.118	0.308	***	0.039
Financial income	0.424	***	0.118	0.361	**	0.181	0.021	**	0.008
Location (NCR)	29,795.4	***	2242.8	30,218.0	***	2,213.2	29,649.0	***	1,460.8
Household size	-6,364.7	***	409.8	-11,007.4	***	525.5	-16,903.0	***	377.8
Age	1,247.4	**	556.1	1,438.9	***	476.4	1,379.3	***	299.9
Age squared	-6.9		6.3	-5.7		5.0	-5.7	*	3.0
Gender	1,687.1		1892.8	7,673.4	***	2,146.9	2,198.9		1,378.0
Agriculture	-8,114.2	***	969.0	-11,072.8	**	4,980.1	-35,151.1	***	2,725.2
Constant	27,358.3	**	11665.7	50,076.0	***	10,469.5	117,698.3	***	6,972.8
No. of observations	6,984			5,644			20,865		
R-squared	0.371			0.229			0.199		

(Notes) NCR is the National Capital Region (Manila region), while Robust STE is robust standard error.
*** significant at 1% level, ** significant at 5% level, * significant at 10% level.
(Source) Authors' calculation based on FIES in 1997, 2006 and 2018.