

# Decomposition Analysis of Income Inequality in Eastern Visayas, Philippines

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This study aimed to explore and decompose income inequality in Eastern Visayas, Philippines into the following factors: location (urban-rural), age, educational attainment, and sources of income using expenditure and income approach for 2000 and 2006. Inequality in the region remains high but tends to diminish mildly. Using decomposition analysis, results revealed that inequality is mostly explained by the within-group inequality component. When decomposing inequality by income source, results showed that total inequality is largely influenced by wage income while income from agricultural sector contributed the least share to total inequality. In addition, an increase in wage income will further aggravate inequality while an increase in income from agriculture sector will tend to reduce inequality. Policy makers should refocus its efforts in enhancing agricultural productivity as means of easing out inequality in the region.

**JEL Classifications:** I24, O15, R12, R20

**Keywords:** inequality, income, expenditure, Gini index, Theil indices

It is often heard that in the Philippines, “the poor becomes poorer while the rich gets even richer.” This statement was echoed in a recent study conducted by the Asian Development Bank (ADB). There is a widening gap between classes of the society and the apparent difference is between the rich and the poor. According to ADB (2009), inequality has persistently remained high and hardly changed for more than two decades. Although the Gini coefficient improved in 2006 compared to its level in 2000, it still remained

high compared with other Asian countries. This in turn limits the impact of economic growth on poverty reduction. In a study conducted by Estudillo (1997) regarding income inequality in the Philippines, it conclusively showed that income inequality was indeed high and the trends were fairly stable. Balisacan and Fuwa (2004a) also mentioned that the Philippines has been known for its high level of income inequality.

Has the gap between the rich and the poor in the Philippines been left unattended or might be that

government initiated reforms but were not hitting the target? With high income inequality, the pace of poverty reduction would be unacceptably slow. Deininger and Squire (1998) showed that inequality reduces income growth for the poor but not the rich. Referring to ADB's report in 2009, one of the major causes of poverty in the country is the high and persistent level of inequality on income and assets, which dampen the positive impact of economic expansion. Relatively in a country with high incidence of poverty, dealing with income inequality is directly dealing with poverty reduction. In addition, Wade (2004) mentioned that widening income inequality within country is a matter of concern because higher income inequality within countries goes with higher poverty, slower growth, higher unemployment, and higher crime rates. Thus, policy makers should have keen interest in addressing inequality in the country. As Ravallion (2001) indicated, in an economy where inequality is persistently low, one can expect that the poor will tend to obtain higher share of the gains from the growth than in an economy in which inequality is high.

It is quite evident that on a national scale, income inequality is high but very little has been known about sources of income inequality on a regional scale. In fact, Balisacan and Fuwa (2004b) pointed out that major focus of attacking high inequality in the Philippines should perhaps be on the sources within region inequality. He further stressed out that human capital stock and demographic composition and infrastructure access could be the major factors affecting within regional income disparity. However, only limited studies dealt on investigating regional inequality in the Philippines. This study will fill that gap by exploring the factors underlying inequality in one of the regions in the Philippines, the Eastern Visayas region. This paper attempted to analyze how far income inequality has changed from 2000 to 2006. This paper also analyzed the factors which explain income inequality in the region. It investigated into the sources that influence inequality by decomposing it using

expenditure approach into factors including location or urbanity, age and education of household head, and sources of income. Results of the study would provide significant input for policy formulation aimed at reducing income inequality in the region which would directly help in the country's poverty reduction program. To the best of the author's knowledge, this is the first paper that deals with inequality focusing on Eastern Visayas, Philippines. Eastern Visayas is of particular interest in this paper because it is one of the regions in the country where income inequality is high. In fact Leyte, one of the provinces in Eastern Visayas, was ranked second in 2000 next to Zamboanga del Norte in terms of provinces with highest Gini<sup>1</sup> coefficient (National Statistical Coordination Board [NSCB], 2012). In addition, Eastern Visayas also showed an alarming increase in terms of poverty incidence among families from 30.2% in 2003 to 33.2% in 2006, though not the highest incidence but the region is ranked fifth highest (NSCB, 2012). However, the methods used in this study can also be applied to other regions in the country.

The rest of the paper is organized as follows. The next part presents the available study in the literature followed by measures of inequality explored in this study. After the measures of inequality, the methodology is presented followed by the discussion of the results. The last part summarizes and presents possible policy recommendation based on the results of this study.

## REVIEW OF RELATED LITERATURE

A study conducted by the International Labor Organization [ILO] (2007) stated that the challenge of poverty reduction cannot be disassociated from that of equity. When income inequalities are large or rising, the working poor benefit less than high-income groups from economic growth and productivity gains, and this impedes poverty reduction. Yuen and Long (2009) noted the alarming increase of income inequality in the Philippines. According to its report, the

Gini coefficient which is a common indicator of income inequality, notably showed an increase from 42.9 in 1994 to 46.1 in 2000. On the other hand, Haspels and Majurin (2008) noted that although it has been reported that Gini coefficient posted a decline in 2000 from its 1997 level, still its level is high. ADB (2009) provided a thorough exploration of poverty and income inequality in Philippines. Income inequality remained severe in 2006, as the richest 20% of Filipino families (3.5 million) accounted for 53% of total family income, while the poorest 80% (13.9 million) had to share the remaining 47%. Compared with its ASEAN neighbors, the Philippines has the highest level of inequality. This is one reason why poverty reduction in the Philippines has been slow relative to other countries (ADB, 2009).

With regards to income disparity decomposition, quite a handful of studies had dealt with inequality decomposition on national scale. Estudillo (1997) analyzed the income inequality in the Philippines from 1961 to 1991. She looked into the trend and major sources of household income inequality and found out that income inequality was high and the trends were fairly stable except for a sharp decline in 1985. The Gini coefficient of income inequality has been consistently close to 0.50. This has been attributed to (1) rising proportion of urban households, (2) age distribution changes, (3) increasing number of the highly educated, and (4) rise in wage rate inequality. Estudillo, Quisumbing, and Otsuka (2001) identified the determinants of changes in household income structure and income inequality using data from five rice-growing villages in the Philippines in 1985 and 1998. Result showed that there was a structural shift of household income in favor of nonfarm income during the post-Green Revolution period. The shift in household income structure resulted in a remarkable increase in the inequality of nonfarm income. The share of farm income in the total household income as well as the inequality of its distribution declined substantially in the last 13 years. Balisacan and Fuwa (2004b) conducted an exploratory research on the changes of income inequality in the country from 1985

to 2000 with special focus on the importance of spatial income inequality. They found out that despite major fluctuations in macroeconomic performances, their decomposition analysis showed that income inequality remained stable in the Philippines.

However, studies dealing with regional inequality decomposition are very scarce. According to NSCB (2010), Leyte ranked second of the 10 provinces with remarkably high Gini coefficient. But insofar as of the writing of this paper, no study is available in the literature investigating the sources of income inequality on a regional level. Hence this study hopes to fill that gap by investigating one of the poorest and highly unequal regions in the Philippines, the Eastern Visayas region also known as Region 8.

### *Measures of Income Inequality*

This paper considers the importance of the four criteria for inequality measurement in deciding which measures will be used in the study. Three inequality indices were used: the Gini coefficient, Thiel Index T, and Theil L. The inequality indices used satisfies four basic properties: (1) the Pigue-Dalton condition, (2) mean independence, (3) population-size independence, and (4) decomposability. Pigue-Dalton condition states that an income transfer from a wealthier person to a poorer person that does not reverse the relative income rank would reduce the degree of inequality. Mean independence points out that when all income are multiplied by a constant factor  $k$ , the degree of inequality does not necessarily change. Population-size independence holds that when a number of people at each income level is changed by the same proportion, the inequality remains the same. Decomposability allows partitioning of the degree of inequality either into subpopulation of sources. The principle of decomposability allows dissecting the degree of inequality into several subgroups. An inequality index is said to be additively decomposable if total inequality can be written as the sum of the between-group and within-group inequality.

For group decomposition, Theil index  $T$ , Theil second measure  $L$ , and Gini Coefficient ( $G$ ) were used as the inequality indices. The first two measures satisfy all the suitable properties of a distribution index. The Gini coefficient satisfies the first three properties and is decomposable by income source. However, it cannot be written as the sum of between and within-group inequality components. Using these different indices will provide a holistic view on income inequality given that Gini index is sensitive to changes in the middle-income range, Theil  $L$  index on the other hand, is sensitive to changes in the lower-income levels while Theil  $T$  is sensitive to changes in the upper-income levels.

**METHODOLOGY**

The source of data for this study is the Family Income and Expenditure Survey (FIES) conducted by the National Statistical Office. The survey is done regularly at a three year interval. This paper used available data from FIES in year 2000 and 2006.

In order to decompose income inequality, the procedure discussed below was used. This decomposition procedure is consistent with what Estudillo (1997) and Akita, Lukman and Yamada (1999) did and is adopted for this paper for inequality decomposition analysis in Eastern Visayas, Philippines.

**Group Decomposition**

The following terms used in the group decomposition are defined below:

- $y_i$  = income of the  $i$ th household
- $n$  = number of households in the population
- $m$  = arithmetic mean income of the population
- $n_j$  = number of households belonging to the  $j$ th group
- $m_j$  = arithmetic mean income of the  $j$ th group
- $\mu$  = mean income or expenditure of the household

$r$  = refers to the household ranks when they are sorted by income or expenditure

The formulas used for Theil  $T$ , Theil  $L$  and Gini respectively are:

$$T = \frac{1}{n} \sum_i \frac{y_i}{m} \log \frac{y_i}{m} \tag{1}$$

$$L = \frac{1}{n} \sum_i \log \frac{m}{y_i} \tag{2}$$

$$G = \frac{2}{nu} Cov(y_i, r) \tag{3}$$

The decomposition equations for Theil  $T$  and Theil  $L$ , when households are segregated into mutually exclusive and exhaustive groups, are:

$$T = \sum_j \left( \frac{n_j m_j}{n m} \right) T_j + \sum_j \left( \frac{n_j m_j}{n m} \right) \log \left( \frac{m_j}{m} \right) \tag{4}$$

$$L = \sum_j \left( \frac{n_j}{n} \right) L_j + \sum_j \left( \frac{n_j}{n} \right) \log \left( \frac{m_j}{m} \right) \tag{5}$$

where  $T_j$  and  $L_j$  are, respectively, the Theil indices ( $T$  and  $L$ ) corresponding to the  $j$ th household group. If we define,

$$v_j = \frac{n_j}{n}, \text{ the population share of the } j\text{th group}$$

$$k_j = \frac{m_j}{m}, \text{ arithmetic income share of the } j\text{th group}$$

Equations (4) and (5) can be rewritten respectively as,

$$T = \sum_j v_j k_j T_j + \sum_j v_j k_j \log k_j \tag{6}$$

$$L = \sum_j v_j L_j + \sum_j v_j \log k_j \tag{7}$$

The first term of equations (6) and (7) (the within-group component) is a simple weighted sum of the subgroup inequality values. The second term is the between-group component, reflecting the inequality contribution due solely to differences in the subgroup means.

### *Gini Decomposition by Source*

The first step in decomposing the Gini coefficient is to divide the total household income into mutually exclusive and exhaustive income sources. Total income is then arranged from lowest to highest and a rank is given to each household. The lowest rank goes to the household with the lowest income.

The Gini coefficient of the total income  $G$ , is computed as shown in equation (3). The Gini coefficient of the  $i$ th income source,  $G_i$ , is

$$G_i = \frac{2}{nu_i} Cov(y_i, r_i) \quad (8)$$

where  $u_i$  refers to the mean income of the  $i$ th income source,  $y_i$  is the series of incomes from the  $i$ th source, and  $r_i$  refers to the corresponding ranks.  $G$  and  $G_i$  can be combined to form

$$G = \sum_i \frac{u_i}{u} R_i G_i \quad (9)$$

where  $R_i$  is the rank correlation ratio which can be expressed as,

$$R_i = \frac{Cov(y_i, r)}{Cov(y_i, r_i)} \quad (10)$$

The numerator for equation (10),  $Cov(y_i, r)$ , is the covariance between source income amount and the total income rank while the denominator captures the covariance between source income amount and source of income rank. Equation (9) shows that  $G$  is a product of three terms: (1) the share of the  $i$ th income source in the total income ( $u_i/u$ ), (2) correlation of the  $i$ th source income with the rank of total income ( $R_i$ ), and (3) Gini coefficient of the  $i$ th income source ( $G_i$ ). To express the contribution of the  $i$ th income source as a fraction of total inequality, equation (9) can be expressed as

$$1 = \sum w_i g_i \quad (11)$$

where  $w_i = u_i/u$  and  $g_i = R_i(G_i/G)$  is the relative concentration coefficient. If  $g_i > 1$  then the  $i$ th income source is inequality-increasing implying

that an increase in income coming from that particular source will aggravate inequality. On the other hand, if  $g_i < 1$  then the  $i$ th income source is inequality-decreasing implying that an increase in income from that source will help ease out inequality. Equation (11) provides helpful information in dealing with income inequality in Eastern Visayas. It delves into sources of income which contributes to income inequality. It will provide significant input for policy formulation so that the government could hit the target and bring down the gap between the rich and the poor in the region.

Instead of using the income distribution of the households in evaluating inequality, this study utilized data on household expenditure. According to Akita, Lukman, and Yamada (1999), welfare levels at any given point of time are likely to be better indicated by current consumption expenditure than by current income. In addition, expenditure is more reliable than income as an indicator because it does not vary as much as income. Also in surveys, some respondents are more likely to bloat their income profile than on their expenditure profile. This makes expenditure data better relative on income data in capturing the household economic profile. Deininger and Squire's study (1996) stated that the expenditure distribution tends to be significantly and systematically more equitable than income distribution. Klasen (2000) stressed that expenditures are preferred to incomes as they are likely to give a better impression of long-term or lifetime resources and are more reliably reported than household income. So for decomposition analysis as to within and between-group inequality, this study used expenditure approach. Expenditure approach also has advantage over income approach because income is unreliable and difficult to collect in developing countries especially in rural settings according to Hentschel and Lanjouw (1996); and so household expenditure may provide a better proxy for long term economic status (Deaton, 1992). But for decomposition by income source, information on household income was used so as to evaluate



which income sources will influence inequality to rise or decline.

the highest expenditure while those who have no formal education have the least average household expenditure.

## RESULTS AND DISCUSSIONS

Table 1 presents the average household expenditure disaggregated into household characteristics such as location, age of household head, and educational attainment for years 2000 and 2006. The average expenditure of urban households is twice more than the rural households. In terms of age, households headed by someone aged 41 to 60 have relatively higher expenditure as compared to households in the younger age bracket. College graduate households posted

### *Population Share and Relative Expenditure*

Table 2 presents the population share and relative expenditure of households in Eastern Visayas for years 2000 and 2006. Throughout the period covered, urban share was increasing and is consistently high ranging from 52% in 2000 to almost 80% in 2006 while the share of rural households declined from 48% in 2000 to 21% in 2006. This may indicate potential domestic migration from rural to urban areas in Eastern Visayas. The relative expenditure of households in urban areas is higher than unity in both periods

**Table 1.** *Average Household Expenditure by Household Group for Years 2000 and 2006*

Household group	2000			2006		
	Mean	Min	Max	Mean	Min	Max
Location:						
Urban	101,916.4	3,763	787,590	158,102.8	16,504	1,282,035
Rural	56,078.8	4,866	1,091,724	90,172.5	10,495	1,611,937
Age:						
less than 30	58,126.03	14,752	441,376	63,454.7	14,185	243,278
31 – 40	75,126.1	5,739	613,057	93,964.9	21,539	701,949
41 – 50	100,282.9	9,040	1,091,724	114,230.9	10,770	680,416
51 – 60	82,574.3	8,406	618,289	120,872.5	12,425	1,282,035
61 and above	68,513.4	3,763	658,585	100,707.5	10,495	1,611,937
Education:						
No school attended	34,805.8	5,739	162,894	47,222.0	10,495	116,210
Elementary Level	54,893.9	3,763	398,821	64,999.6	10,587	455,119
Elementary Graduate	81,048.4	8,481	515,091	74,994.8	14,185	715,385
High School Level	115,995.6	9,040	707,966	100,617.4	11,705	1,611,937
High School Graduate	57,309.5	25,931	129,771	117,514.5	21,539	846,739
College Level	86,351.2	26,539	177,818	174,418.5	21,958	855,098
At least College Grad.	216,592.2	28,619	1,091,724	260,416.9	26,222	1,282,035
All	79,852.5	3,763	1,091,724	104,429.5	10,495	1,611,937

\* *The average income is an annual household income measured in Philippine currency (pesos)*

implying that urban households spend more on the average than rural households.

With regards to age of household head, the share of youngest households marginally increased from 6% to 7% while the share of oldest households substantially decline from 31% in 2000 to 26% in 2006. I observed in both years that the population share of the oldest group (aged 61 and above) occupies a relatively larger share as compared to other age groups.

Looking at the relative expenditure of households by age groups, households within 41 to 50 and 51 to 60 years old age bracket are observed to have higher expenditure relative to the other household groups. Its relative expenditure value is greater than unity which means it is higher than the average. Meanwhile, households headed by those who fall in the youngest age bracket have the least expenditure both in 2000 and 2006.

**Table 2.** *Population Share and Relative Income (2000-2006)*

Household Group	Population Share		Relative Expenditure*	
	2000	2006	2000	2006
<i>(All households = 1.00)</i>				
Location:				
Urban	0.52	0.79	1.28	1.51
Rural	0.48	0.21	0.70	0.86
All	1.00	1.00		
<i>(All households = 1.00)</i>				
Age:				
less than 30	0.06	0.07	0.73	0.61
31 – 40	0.18	0.21	0.89	0.90
41 – 50	0.23	0.25	1.27	1.09
51 – 60	0.22	0.21	1.06	1.16
61 and above	0.31	0.26	0.86	0.96
All	1.00	1.00		
<i>(All households = 1.00)</i>				
Education:				
No school attended	0.04	0.04	0.44	0.45
Elementary Level	0.62	0.36	0.69	0.62
Elementary Graduate	0.12	0.18	1.01	0.72
High School Level	0.11	0.12	1.45	0.96
High School Graduate	0.01	0.12	0.72	1.13
College Level	0.01	0.08	1.08	1.67
At least College Grad.	0.10	0.10	2.71	2.49
All	1.00	1.00		

Source: Author's computation from the FIES (2000, 2006)

\* For the relative expenditure, values less than unity indicate that the mean income of the group is lower than the average mean income of all households

In year 2000, more than 60% of the households in Eastern Visayas were headed by someone who just have primary education and in 2006 this share declined to 36%. Though the share of households with at least college level education is relatively small, it increased from 1% in 2000 to 8% in 2006. Improvements were also observed with increasing share of households headed by someone who have completed elementary schooling and acquired some high school education.

There was a considerable difference between the average income of the highly educated households (college graduate) and those with no formal education. The relative expenditure of the highest education group is 2.71 (in 2000) and 2.49 (in 2006) while the lowest education group's relative expenditure is only 0.44 (in 2000) and 0.45 (in 2006). However, it is worth to note that in year 2000, households headed by someone who finished elementary or at most high school level have higher spending on average as compared to those households headed by someone who is a high school graduate but in 2006, results were as expected. Those households headed by someone who have higher level of education spend more on the average compared to households with lower level of education.

Basing from Table 2, it can be generalized that the sample households used in this study are largely situated in urban areas, relatively older, and have elementary level of education.

### ***Inequality Decomposition Using Expenditure Approach***

The three measures of inequality revealed that in Eastern Visayas inequality is still high but somehow a little progress is also evident because it declined from 2000 to 2006. The Gini index for 2000 is 0.44 and then it declined to 0.43 in 2006. For Theil T, inequality declined from 0.36 to 0.34 and for Theil L, results show that the index also declined from 0.56 to 0.54. The three indices of inequality consistently showed a declining inequality in the region, however, the decline is very marginal. To explain this,

I investigated the demographic structure of households disaggregating them into location, age distribution, and educational attainment.

When disaggregating the Gini index into urban and rural sector, result showed that urban inequality is declining however inequality in rural area is rising. Quite surprisingly in year 2006 as revealed by Gini index only but not with Theil indices, rural inequality is even higher than urban inequality. This information would merit further investigation which is not done in this paper. In most cases inequality is higher in urban areas rather than in rural areas which confirm the classic observation that the degree of inequality is greater among urban households than among rural households.

Aside from Gini index, Theil T and L were also computed and decomposed into urban and rural sectors. Theil T measure of inequality is sensitive to changes in upper income level. Looking at the result, Theil T declined to 0.34 in 2006 from 0.36 level in 2000. The same observation like Gini index can be drawn when Theil T is decomposed into urban and rural sector. Urban inequality tends to decrease while rural inequality increases from year 2000 to 2006. For Theil L which is sensitive to changes in lower income level, inequality showed a declining trend too from 0.56 in year 2000 to an index of 0.54 in year 2006. But with Theil L, it is the urban household that showed increasing trend while households in rural areas showed declining trend. Generally, the overall decline in inequality is largely due to the decline in urban inequality but this decline is offset by the rising rural inequality.

In terms of age distribution, Table 3 shows that households headed by someone who is 40 years old and below have relatively lower inequality compared to households aged 41 and above. The highest inequality is observed among households aged 61 years old and above. This huge disparity in expenditure from the oldest group is driven by structural difference. Those who were employed in formal sectors do receive pensions while those who were not largely have no pensions. By this time, these households do not have stable income



**Table 3.** *Inequality Decomposition Using Expenditure Approach (2000-2006)*

Household Group	Gini		Theil T		Theil L	
	2000	2006	2000	2006	2000	2006
Location:						
Urban	0.44	0.41	0.34	0.32	0.48	0.53
Rural	0.36	0.42	0.26	0.30	0.47	0.40
All	0.44	0.43	0.36	0.34	0.56	0.54
Within group inequality			0.31	0.31	0.52	0.51
%			88.2%	90.8%	92.6%	93.5%
Between group inequality			0.04	0.03	0.04	0.04
%			11.8%	9.2%	7.4%	6.5%
Age:						
less than 30	0.36	0.27	0.24	0.14	0.37	0.19
31 – 40	0.36	0.36	0.24	0.24	0.33	0.34
41 – 50	0.45	0.41	0.37	0.30	0.58	0.41
51 – 60	0.43	0.45	0.33	0.36	0.48	0.54
61 and above	0.46	0.49	0.40	0.45	0.63	0.78
All	0.44	0.43	0.36	0.34	0.56	0.54
Within group inequality			0.34	0.33	0.54	0.53
%			95.8%	96.8%	97.2%	98.1%
Between group inequality			0.02	0.01	0.02	0.01
%			4.2%	3.2%	2.8%	1.9%
Education:						
No school attended	0.31	0.29	0.17	0.13	0.22	0.13
Elementary Level	0.32	0.31	0.18	0.18	0.24	0.24
Elementary Graduate	0.37	0.30	0.24	0.16	0.33	0.25
High School Level	0.39	0.37	0.26	0.30	0.36	0.68
High School Graduate	0.25	0.36	0.10	0.24	0.11	0.34
College Level	0.32	0.40	0.16	0.27	0.17	0.34
At least College Graduate	0.35	0.32	0.20	0.17	0.23	0.19
All	0.44	0.43	0.36	0.34	0.56	0.54
Within group inequality			0.21	0.21	0.36	0.38
%			57.7%	60.1%	65.3%	69.3%
Between group inequality			0.15	0.14	0.19	0.17
%			42.3%	39.9%	34.7%	30.7%

Source: Author's computation from FIES (2000, 2006)

due to old age, so disparity is high between those pension dependent senior citizens and those who do not have pensions. This observation is also echoed with Theil T and Theil L. Households in the lower age bracket posted lower inequality while households which fall in the oldest age bracket have the highest Theil T. The same observation can be drawn with Theil L.

Expenditure inequality was also disaggregated based on the educational attainment of household heads. Inequality tends to decrease for those households headed by someone with lower level of education while households headed by someone who acquired high school and with some college education, inequality tends to increase from 2000 to 2006. The disparity in expenditure is highest for households with heads who are either high school or college level. For Theil T and Theil L, similar observation can be drawn. For households headed by someone with no formal education up to elementary graduate, inequality was decreasing while for households with higher level of education, particularly from high school up to college, inequality was observed to be increasing. Inequality tends to decrease at the lower educational bracket and in the highest bracket but this is offset by the rising inequality in the middle educational bracket.

An N-shaped kind of relationship is observed between households' educational attainment and level of inequality. Inequality is lower in the lowest educational attainment bracket and then inequality rises in the middle part and then declines and rises again as households acquire more education. So if the region's concern is to cut down inequality, it is good to push the youth to acquire some level of education.

### ***Decomposition of Inequality Between and Within-Groups***

An inequality index is additively decomposable if the total inequality can be expressed as a sum of within-group and between-group inequalities. With the three measures of inequality considered in this study, Theil T and Theil L are indices which

are additively decomposable while Gini index is source decomposable. For this reason, Theil T and Theil L are used to evaluate inequality between and within-group.

Referring to results in Table 3, it is evident that the contribution of the between-group component of inequality is lower compared to the within-group component. This result is consistent in three household characteristics considered in this study. For urban or rural distribution, between-group inequality contributes only at most 12% of the total inequality while within-group inequality contributes largely to the total inequality with 88% of the least contribution. Thus, if we eliminate household income disparities between rural and urban sectors while keeping the within-group component at the same level, aggregate inequality will decline roughly on the maximum around 12%.

With regards to changes in age distribution, the bulk of inequality is also attributed to within-group inequality, that is 96% and even higher. This means that the changes in age distribution or across age level contribute only less than 4% of the total inequality. It is the inequality within the age bracket that largely explains total inequality and not the differences in age of household heads.

For educational attainment, although within-group inequality contributes higher to total inequality compared to between-group, the difference in its contribution is not far from the contribution of between-group inequality. Within-group inequality contributes 57% to close to 70% while between-group inequality ranges from 31% to 43%. This means that between-group inequality or the difference in the level of educational attainment of household heads matters in explaining total inequality. These results are consistent both in Theil T and Theil L indices. It presents a different story from the other factors considered since inequality attributed to between-group or the level of educational attainment weighs almost half of the total inequality. Its contribution is high and should merit attention for policy makers to trim down inequality in Eastern Visayas. Within this decomposition

scheme, result shows that expenditure inequality can be both attributed to within and between-group inequalities although the contribution of the within group inequality component is more pronounced.

### ***Gini Decomposition by Income Source***

It is helpful to decompose inequality by income source because it will present evidence on which income sources are inequality-increasing or inequality-decreasing. Four main sources of income<sup>2</sup> are being evaluated, including (1) income from agriculture, (2) wage income for households engage in the formal labor market, (3) income from entrepreneurial activities and other non-agriculture related activities and (4) other sources of income which includes property income, remittances, pensions, other transfers, and so forth.

Table 4 shows that wage income was the main source of income in year 2000 followed by nonfarm, self-employment income, then other sources of income while agricultural income contributes the least. In 2006, wage income reduced to 34% and is now the same percentage with other sources of income. This partially indicates that there is a structural shift in terms of households' sources of income in the region. Even though income from agriculture sectors increased, still it contributes less than 10% of the total income in Eastern Visayas.

The relative concentration ratio ( $g_k$ ) showed which income sources are inequality-increasing or inequality-decreasing. An income source is said to be inequality-increasing if  $g_k$  is greater than unity and inequality-decreasing if  $g_k$  is less than unity. Table 4 shows that in 2000, the inequality-increasing source of income is wage income while in 2006 aside from wage income, other sources of income also showed that it is an inequality-increasing source. This implies that an increase in income from these sources will worsen income inequality in the region. This captures the huge disparity in income

between those employed and unemployed. In addition, the differences in the salary in formal labor market both in public and private could explain why wage income contributes to increasing inequality. Other sources of income also aggravate income inequality. This can be explained by the surging increase in international remittances that are included in other sources of income. The Philippines is a huge remittance recipient country and it helped explain why other sources of income is an inequality-increasing in year 2006. Income coming from agriculture, non-farm, and self-employment are consistently inequality-decreasing sources of income. This shows that enhancing income from agriculture sector will help tame down inequality in the region. This result is consistent with the study of Estudllo (1997) which revealed that wage income, remittances and pensions, and property income were sources of increasing inequality, whereas, entrepreneurial income, and agricultural income are inequality-decreasing sources.

Factor inequality weight is calculated as the product of income share of each source and its relative concentration ratio. This represents the proportion of overall income inequality contributed by an income source. Wage income contributed the largest share to overall inequality with 54% in 2000 and 45% in 2006. Wage income is followed by other sources of income, then non-farm and self-employment source of income with income from agricultural sector contributing the least to overall inequality.

An increase in income from agriculture sector tends to reduce inequality but its contribution to total inequality is considerably marginal. Hence, policy makers should device policies that will help improve the productivity in agricultural sector. In addition, non-farm and other self-employment sources of income contribute to easing out inequality in the region. With this, aside from promoting agricultural productivity policy makers should also support small business and other entrepreneurial endeavors within the region.

**Table 4.** *Gini Decomposition by Income Source, Total Income Variable (2000-2006)*

Source	Share of income from source k		Gini coefficient of income from source k		Rank correlation ratio		Relative concentration ratio		Factor inequality weight	
	$W_k$		$G_k$		$R_k$		$g_k=(G_k R_k)/G$		$(W_k G_k R_k)/G$	
	2000	2006	2000	2006	2000	2006	2000	2006	2000	2006
Agricultural income	0.02	0.04	0.91	0.83	-0.15	-0.27	-0.27	-0.44	-0.01	-0.02
Wage income	0.41	0.34	0.79	0.81	0.85	0.83	1.32	1.35	0.54	0.45
Nonfarm, self-emp. income	0.30	0.29	0.67	0.61	0.58	0.57	0.77	0.70	0.23	0.20
Other income	0.27	0.34	0.62	0.65	0.73	0.82	0.89	1.07	0.24	0.36
Total income	1	1	0.51	0.50					1	1

Source: Author's computation from the FIES (2000, 2006)

## SUMMARY AND POLICY RECOMMENDATION

This paper aimed to investigate income inequality in the Eastern Visayas, Philippines using data from FIES for years 2000 and 2006 and decompose inequality into different sources. Four possible inequality sources were examined; (1) high proportions of urban population; (2) changes in age distribution of household head; (3) differences in educational attainment of household head, and (4) income sources. Two approaches were used in the decomposition analysis: (i) expenditure approach for decomposing within and between inequality and (ii) income approach for decomposing inequality by different sources of income. I used expenditure data in analyzing household inequality because expenditure data serves a better proxy for the household economic profile as compared to income data which is more problematic to collect.

Results showed that income inequality in Eastern Visayas remains fairly high with Gini index harboring over 0.40. Though inequality is high, we observed that it declined over the six-year period. However, the decline may not be significant since it is very marginal. Gini index in 2000 is 0.44 and slightly reduced to 0.43 in 2006. The same observation can be drawn with Theil T and Theil L. To explain this

high inequality in the region, I investigated three household characteristics, namely: location, age distribution, and educational attainment that are typically cited as factors influencing household income inequality. When disaggregating into urban and rural location of households, I found out that inequality in urban households is higher than the rural households. There was a decline in inequality among urban households but this is offset by the increasing inequality among rural households. Inequality decomposition by age distribution shows that older households are more unequal than younger households. For educational attainment, it follows an N-shaped kind of relationship between households' level of education and inequality. Initially at lower level of education, inequality is rising and reaches its peak around high school level of education and then declines and later increases again towards highest level of education.

Inequality in the region was further decomposed into within-group and between-group inequality using Theil T and Theil L. Results showed that a greater portion of the total inequality is largely explained by the within group inequality. This result is more pronounced in the factors such as increasing proportion of urban population and changes in age distribution. However with the changes in educational attainment, the between-group inequality substantially contributes to total

inequality. This means that inequality across levels of educational attainment also matters in explaining total inequality aside from the inequality that is observed within-group.

We used Gini index to decompose inequality into sources of income. Results showed that wage income is the main source of household income. The relative concentration ratio showed that an increase in wage income and other sources of income are driving inequality to increase while an increase in income coming from agriculture will tend to pull inequality down. Among the different sources, wage income contributed the largest share to income inequality while income from agriculture contributed the least to overall inequality in Eastern Visayas, Philippines.

From these results, the following policy implication can be drawn. Since an increase in income coming from the agriculture sector will push inequality down, then it is worth venturing to device policies aiding the agriculture sector in Eastern Visayas. Its effect is twofold. First, it will reduce income inequality in the region specifically in the rural areas and second, it will provide an opportunity for growth since agriculture has the lowest share to total household income. Income coming from agriculture contributes only less than 10% of the sources of income in the region and this share is relatively low. However, efforts to boost agricultural productivity are faced with substantial climate risk. The region is situated in an area where farmers constantly face a lot of income shocks from frequent and stronger typhoons. This could also explain the persistent level of poverty and inequality in the region. Nevertheless, policy makers should device policies that are beneficial to the agricultural sector such as providing support to farmers, building infrastructure and other mechanism that will boost agricultural productivity. Policy makers should also look into making wage income more equitable since it contributes a greater share to the total inequality in the region. With regards to changes in the age distribution, households belonging to oldest age bracket have the highest inequality. There are programs in the government

that looks into the welfare of senior citizens but it seems not translated as reflected in this study but this merits further investigation. It also pays to invest in education since better educational attainment posted lower inequality.

## NOTES

- <sup>1</sup> Gini coefficient is one of the measures on income inequality. Gini coefficient ranges from 0 to 100. It is the ratio of the area between the Lorenz curve and the diagonal line of perfect equality. A Gini coefficient of 0 indicates perfect equality and a Gini coefficient of 100 indicates extreme inequality.
- <sup>2</sup> The aggregation of income was based on Family Income and Expenditure Survey (FIES).

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