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by

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Abstract

This paper examines the link between poverty and income, on the one hand, and human capital and location, on the other. In the process, the paper proposes a shift in the household indicator of human capital from the usual education of the household head to the education of the most educated member. The paper finds poverty to be most severe and persistent for households with low human capital, and that the effect of human capital varies substantially across locations. Additionally, the paper finds that low human capital households tend to underinvest in the human capital of school-age members, thus likely perpetuating poverty.

Key Words: human capital, poverty, chronic poverty, regional development, enrolment rates

JEL Classification Codes: I32, J24, I21, R11

1. Introduction

The high incidence and depth of poverty in the Philippines has persisted for decades. While its Southeast Asian neighbours have succeeded in bringing poverty incidence down to single digit and even zero level, 20% of families and 25% of the population of the country have remained poor. The country's slower growth is only part of the reason. Balisacan and Fuwa (2004) found that the elasticity of poverty with respect to growth is lower in the Philippines than in its neighbours. They also find significant spatial variation of poverty. In 2009, poverty rate across provinces ranged from zero to 60 percent. Areas with high poverty rates experienced a lower drop in poverty rate. These facts could be explained in broad terms by the faulty and non-inclusive growth strategy the government has adopted and which very much deviated from the common strategy that explain the high performance of East Asian economies (WB East Asian Miracle 1994). The Philippines neglected to develop agriculture where most poor lived and made relatively small investment in infrastructure and social services particularly education. The government's development efforts and resources were unequally distributed across provinces and regions and this resulted in their unequal rates of development. For instance Metro Manila and its neighbouring provinces which have received a disproportionately large share of government investments in infrastructure have as developed road system as the US. In contrast some provinces rely on unpaved roads to their capital cities (2012-2013 Philippine Human Development Report).

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The paper examines the persistence of poverty and tries especially to establish its link with lack of human capital. Families may be trapped in poverty if they are unable to increase the human capital of their members and realize increased real return to it. A family's income whether it falls below or above poverty line is determined by the productive capacity of its members and the value of its output. The value or real returns to human capital depends on the state of development of its location. It may be employed in any of several various sectors of particular organization: formal, informal, government, private, large scale or small. Numerous studies including those in the Philippines show that earnings from work increases with education. On the other hand, the quality of a person's environment determines his productivity, the price of his output and its purchasing power or real income.

The Philippines is a country of numerous islands that differ in size and natural endowments. There are plains and mountainous areas of different slopes and elevation. Rainfall pattern varies across the islands and some are regularly visited by typhoons. Some areas like the Central Plains of Luzon are fertile rice lands, while Samar and Leyte have very rugged mountains. Majority of towns and villages are along island coasts where fishing is a major source of livelihood. Many fishing areas have been depleted by overfishing and use of destructive fishing methods. The variation in the quality of land and marine life has resulted in variation in returns to labor inputted in their cultivations and harvesting. The yield of rice and other crops in irrigated plains is much higher than that in rain-fed mountains. Densely populated coastal areas are overfished and give poor output to fishermen. Strong typhoons intermittently visit several regions – Eastern Visayas, Bicol and Southern Quezon.

These geographic divisions have remained because the poorly endowed regions have not been provided adequate good infrastructure and social services to raise their productivity and integrate their economies into the central markets of the country, e.g. Metro Manila. Transport barriers have remained. They raise the cost of moving goods, services and people and segment the markets of underdeveloped areas from each other and from economic and social centers like Metro Manila. People in isolated poorly endowed areas tend to obtain lower prices for their output but tend to pay higher prices for goods imported from other areas. Education and health facilities are limited and the labor market offers few and less varied job choices. Individuals who need tertiary medical treatment will have to avail it in the more developed cities. The youth who wish to pursue an advanced degree may have to pursue it in a distant city where the program is offered. In both cases the cost of the special medical care and special education program is higher for people in geographically isolated areas than in large cities. The higher cost reduces the real income of people in isolated locations. The negative impact of geographic divisions and market segmentation is expected to be worse for the poor than the rich. The poor have a smaller chance of breaking out of poverty in underdeveloped isolated areas.

Reducing the poverty rate to half the current level as set in the MDG would require major shifts in the government's growth strategy and significant improvement in its implementing capacity. The extant poor cannot pull themselves by their bootstraps for their income barely suffices for physical survival. They are poorly educated and live in undeveloped villages that provide them with meagre opportunities for raising their productivity. They devote over 60% of their income on food which appears not to meet the recommended nutritional requirement. The Health and Nutrition Survey show that about 30% of children are undernourished; possibly the same proportion of adults are

undernourished. Minimal budget is allocated to education with about 10% of their children not enrolled at the primary grades. Majority of the poor are in rural areas earning a living in underdeveloped farms and depleted coastal fishing grounds.

The government's essential task is to raise the productivity of their resources through adequate investments in infrastructure and technical improvement. Further providing them with basic services such as education and healthcare would develop their children's human capital and break inter-generational poverty. In the cities, the poor have better access to education and health care but they suffer degrading and unsanitary housing conditions. It is not clear how much slum dwelling in the cities damages the moral sense and dignity of the cities' poor. The country's resources are ample enough to address the poverty problem. Improving the productivity of agriculture, improving transport and communications infrastructure, improving education will positively stimulate the industrial and service sectors as seen in the lessons of East Asian development (World Bank, 1993).

We focus on the role of education in raising the standard of living and well-being of the people and latch our policy recommendations for reducing poverty through education. Education is the principal determinant of a person's capabilities to produce income, to be informed of what the various markets in his locality and outside, to participate in the social and political life of his community and the nation, to pursue further education and training and to make intelligent decision on the choices facing him. It determines age of marriage and number of children. Some level of schooling, possibly high school, develops minimum capabilities for all these pursuits. Those deprived of access to schooling are set for a life of poverty and isolation from much of the community and the nation's economic and social life. They marry young and have more than average number of children. Their job prospects are poor. There is education-job matching and returns to education are generally positive. Here, returns to college education are higher than returns to high school and primary education (Tan, Canales and Cruz 2013; Alba 2002). Job quality in terms of employment stability, regularity of work schedule, working condition and insurance provisions is generally higher the higher the education. College and post college educated workers qualify for professional, academic and administrative jobs that offer attractive terms. Most high school graduates find employment in the formal sector of medium and large firms that offer similar terms of employment. Most low educated workers are employed in the informal sector of small family enterprises. They generally share in the firm's income directly or indirectly as unpaid family workers. Their income is uncertain and relatively low. Providing the poor with at least high school education may be the most effective measure for poverty reduction, assuming that economic growth is sustained at the current level.

The paper is organized as follows. Section 2 gives a brief background on the trend and structure of poverty that focuses on regional disparities and human capital disparities. Section 3 estimates a simple income function relating household income and wages to human capital, location, and their interaction in a bid to quantitatively characterize their relationships. We examine the relative effects of human capital and quality of environment in determining income and the probability of a family to be poor or non-poor. Using panel data, Section 4 tries to trace changes in family circumstances that keep or break inter-generational poverty. The last section summarizes and concludes.

2. Education, Location, and Poverty: Patterns and Trends

From 1997 to 2009, poverty incidence in the country declined slightly from 22.7 percent to 20.8 percent, based on official data (Table 1). Poverty is still largely concentrated in rural areas – poverty incidence is more than 3 times higher in rural compared to urban areas. In 2009, 78 percent of the poor lived in rural barangays. Poverty incidence is in single-digit levels (at least in 2006 and 2009) in the urban areas of more developed regions, specifically Metro Manila, Cordillera Administrative Region (where Baguio City is), Central Luzon or Region 3, CALABARZON, and Western Visayas or Region 6 (where Cebu City is). On the other hand, poverty is consistently high in the rural areas of regions frequently struck by natural disasters like the Bicol Region (Region 5) and Eastern Visayas (Region 8), areas with long-standing political conflict like ARMM and Region 9, and areas like CARAGA and MIMAROPA, which are otherwise underdeveloped and isolated from large markets for goods and services. Natural disasters and political conflict are similar in that they hinder investments, the build-up of infrastructure, and the creation of more productive employment.

Table 1. Poverty incidence by region and by type of area, 1997-2009

Region	Total			Urban			Rural		
	1997	2006	2009	1997	2006	2009	1997	2006	2009
<i>LUZON</i>									
NCR	2.6	3.4	2.6	2.6	3.4	2.6			
CAR	26.1	19.1	17.1	5.9	2.7	2.7	35.1	27.5	26.0
Region 1	23.9	20.6	17.4	12.7	13.7	12.4	29.1	24.7	20.3
Region 2	19.8	15.2	14.4	12.3	8.7	6.3	21.8	17.5	17.5
Region 3	11.2	12.4	11.8	6.0	8.5	8.4	17.8	18.8	17.4
Region 4	14.6			6.4			23.7		
CALABARZON		10.1	10.3		4.0	5.4		22.1	19.7
MIMAROPA		32.8	28.0		24.8	21.7		36.5	30.9
Region 5	41.7	36.8	36.1	24.9	16.9	20.2	47.8	43.5	42.7
<i>VISAYAS</i>									
Region 6	27.0	21.7	23.6	15.3	8.5	9.9	33.8	27.9	29.9
Region 7	33.5	32.4	29.6	16.1	16.4	14.1	47.1	48.6	44.8
Region 8	36.6	30.8	33.1	19.9	14.8	20.6	42.7	34.8	36.4
<i>MINDANAO</i>									
Region 9	28.2	36.2	36.5	9.4	10.8	14.3	36.4	44.7	44.0
Region 10	33.9	31.6	32.4	19.7	18.4	17.7	44.8	41.3	43.3
Region 11	29.5	25.3	25.5	14.2	12.8	11.9	39.3	33.7	35.0
Region 12	35.4	28.1	28.3	17.3	17.3	15.2	43.0	33.0	34.9
ARMM	21.6	37.2	38.1	15.9	27.9	24.3	23.2	39.1	40.8
CARAGA	38.6	35.3	39.7	25.2	23.5	29.5	46.4	41.5	44.8
<i>PHILIPPINES</i>	22.7	21.1	20.8	9.6	9.1	9.1	34.6	32.9	32.3

Source: FIES various years

Over time (1997 to 2009), the poverty rate fell or was flat for all regions except ARMM and CARAGA (Table 1). In 2009, poverty incidence ranged from 2.5 percent in the National Capital Region (NCR) to 44.8 percent in both rural CARAGA and rural Central Visayas.

Table 2, meanwhile, shows the link between poverty and the education level of the household in 2009. Here the education level of the household is indicated by the education of the adult (18 and above) household member with the most education. Note that this differs from the usual education measure for the household which is the education of the household head. [Annex 1 argues that this measure of household education is a better predictor of household poverty than household head education.] Table 2 shows poverty incidence to be above 41 percent for households with at most adult high school undergraduates. Poverty incidence drops to 24 percent for households with at least one adult high school graduate. This drops even more steeply to only 10.7 percent for households with an adult college undergraduate and to only 2.4 percent for households with an adult college graduate. Households with at most an adult high school undergraduate comprise only 28 percent of total households but contribute 56% to total poor households. Households with at least one college undergraduate or college graduate, on the other hand, comprise 46 percent of total households but contribute only 14 percent to total poor households. Note that this pattern has been consistent over time as shown in Annex Table 2 for 2006.

Table 2. Poverty by Education of Most Educated Member, 2009

Education level of Most educated member	Poverty Incidence	Contribution to total poverty	Total # of HHs
Elementary and below	41.0	29.2	2,726,646
HS undergrad	42.4	26.9	2,430,492
HS grad	23.8	30.5	4,895,105
College undergrad	10.7	10.7	3,838,480
College grad	2.4	2.8	4,560,819
Total	20.8	100.0	18,451,542

Source: FIES 2009, LFS January 2010

In the Philippines and a few other countries, returns to education are found to increase with the level of education. Education determines the probability of finding employment in the more attractive formal enterprises and government bureaucracy. The college graduates would qualify for professional jobs and the high school educated qualify for many blue collar jobs in various industries. They are covered by the minimum wage and other protective labor laws. The minimum wage approximates the poverty line so that those who find employment in the formal sector escapes the poverty income from

their locations. The less educated have a smaller probability of employment in the formal sector. Formal sector jobs are concentrated in the larger cities and these attract workers from less developed areas. More young more educated and skilled workers migrate for they have higher probability of landing formal jobs. Fairly high internal migration rate has occurred toward the more progressive and large regions such as the NCR, Central Luzon, Calabarzon and Central Visayas where Cebu, the second largest city is located. The informal sector which consists of small and medium family enterprises offers less attractive employment terms. Family members largely comprise their employees who directly share in the firms' profits and risks. The less educated and the housewives who are heavily burdened by numerous children find employment in micro enterprises that earn low profits. More than 90 percent of the country's firms are small and earn relatively small income.

Table 3 shows the mean income by source and by education level of Philippine households. The table clearly shows that average household income increases substantially as household education level increases, but that, more importantly for our point, it is wages and salaries as well as remittances that exhibit the sharpest increases as education increases. In the case of remittances, it is of course also the case that more educated workers are more likely to find work and to find better quality work overseas than less educated workers, and therefore to send larger amount of remittances to their households (Ducanes, 2011). Average entrepreneurial income and other income do not rise as fast as one goes up the education ladder compared to wages and remittances.

Table 3. Mean Income by Education of Most Educated Member, 2009

Education level of Most educated member	Total income	Wages and salaries	Entrepreneurial income	Remittances from abroad	Other income
Elementary and below	74,082	21,712	26,323	3,031	23,015
HS undergrad	102,594	40,198	33,074	4,530	24,792
HS grad	139,525	61,004	37,267	11,137	30,117
College undergrad	206,405	80,341	51,478	28,704	45,883
College grad	411,704	194,232	70,678	56,386	90,407
Total	206,179	89,411	46,312	23,908	46,548

Source: FIES 2009, LFS January 2010

A point made in the previous section was that the rate of return to human capital is dependent on the state of development of its location. This means that education and quality of environment interact in determining income and poverty. This can be seen very clearly in Table 4, which shows poverty incidence by region and by education level.² In general, poverty rate falls as the education level of the household increases but the effect of education on poverty varies significantly across regions. In

² Annex Table 3 shows a similar table for 2006.

the more developed regions – Central Luzon, NCR and Calabarzon - the poverty rate of families with less than complete secondary education was lower than that in the other regions. In fact in these regions (plus Region 2), the poverty incidence for households with only complete secondary education is already below the national average. In contrast, in conflict-ridden ARMM, poverty incidence for college graduate households is still double-digit (13.1 percent), and for college undergraduate households is still at a high 31.2 percent – much higher than the national poverty incidence. The same is true for underdeveloped CARAGA in Mindanao, where poverty incidence is 9.7 percent for college graduates and 29.4 percent for college undergraduates. The Bicol Region in Luzon and Eastern Visayas are examples of disaster-prone regions where poverty falls more slowly across education levels of households compared to other regions less prone to disasters.

Table 4. Poverty Incidence by Education of Most Educated Member, 2009

Region	Education level of most educated member					Total
	Elementary and below	HS undergrad	HS grad	College undergrad	College grad	
<i>LUZON</i>						
NCR	6.1	10.8	5.6	1.3	0.1	2.6
CAR	23.1	35.4	24.8	16.1	3.9	17.1
Region 1	24.3	30.7	26.5	12.3	2.2	17.4
Region 2	25.2	23.9	18.6	6.7	1.6	14.4
Region 3	23.1	26.1	16.0	6.2	1.2	11.8
CALABARZON	19.4	29.9	14.8	3.9	0.8	10.3
MIMAROPA	42.9	45.5	31.0	10.7	2.9	28.0
Region 5	51.2	56.3	41.6	24.1	3.8	36.1
<i>VISAYAS</i>						
Region 6	41.1	42.8	28.6	11.1	2.5	23.6
Region 7	52.3	51.2	32.1	15.6	4.3	29.6
Region 8	47.7	52.5	38.2	16.9	4.2	33.1
<i>MINDANAO</i>						
Region 9	59.9	56.0	37.2	18.4	3.8	36.5
Region 10	50.4	57.7	40.9	22.4	4.6	32.4
Region 11	48.8	44.1	25.7	9.2	1.6	25.5
Region 12	51.6	41.6	29.0	15.7	4.1	28.3
ARMM	42.2	53.2	39.1	31.2	13.1	38.1
CARAGA	59.8	54.8	49.0	29.4	9.7	39.7
<i>PHILIPPINES</i>	41.0	42.4	23.8	10.7	2.4	20.8

Source: FIES 2009, LFS January 2010

The human capital of the household comprises not just the most educated member but rather all its members, but especially its adult members who have greater capacity for employment. In Table 5, we

show the mean number of adults in households by education for both poor and non-poor households. There were, on average, 2.8 adults in poor households in 2009, and 3 adults in non-poor households.

In a poor household, of the 2.8 adults, 1.6 (58 percent) completed primary schooling at most, one (35 percent) either reached or completed secondary schooling, and the remaining 0.2 (7 percent) reached college. In contrast, in a non-poor household, of the 3 adults, only 0.8 (26 percent) completed primary schooling at the most, 1.1 (38 percent) reached or completed high school, and 1.1 (36 percent) reached or completed college. The average number of college graduates in poor households is close to nil, whereas in non-poor households it is 0.5.

Table 5. Mean no. of adults (18+) by education level, 2009

Poverty Status	Elementary and below	HS undergrad	HS grad	College undergrad	College grad	Total
Average no.						
Non-poor HHs	0.8	0.3	0.8	0.6	0.5	3.0
Poor HHs	1.6	0.5	0.5	0.2	0.0	2.8
Total	1.0	0.4	0.7	0.5	0.4	2.9
% share						
Non-poor HHs	26.3	11.6	26.1	19.1	16.9	100.0
Poor HHs	58.0	17.0	18.4	5.4	1.2	100.0
Total	33.1	12.8	24.4	16.2	13.5	100.0

Source: FIES 2009, LFS January 2010

Table 6 and Table 7 show the mean number of adults by education and by region for poor households and non-poor households, respectively. The poor households in Regions 9, 8, 11, and 7 have an especially low level of human capital, with the share of adults having completed at most incomplete secondary in each of those regions exceeding 80 percent. On the other extreme, in Region 1, NCR, and Region 3, more than a third of adults in poor households completed at least secondary education. Among non-poor households, in all regions except ARMM, majority of adults completed at least secondary schooling. In NCR, CAR, and Region 10, more than 40 percent of adults in non-poor households attained at least incomplete tertiary education.

Table 6. Poor: Mean no. of adults (18+) by education level by region, 2009

Region	Education level					Total
	Elementary and below	HS undergrad	HS grad	College undergrad	College grad	
<i>LUZON</i>						
NCR	0.9	0.8	1.0	0.1	0.0	2.9
CAR	1.6	0.5	0.5	0.3	0.1	3.0
Region 1	1.2	0.4	1.2	0.2	0.0	3.0
Region 2	1.8	0.4	0.6	0.1	0.0	2.8
Region 3	1.4	0.5	0.9	0.2	0.0	2.8
CALABARZON	1.4	0.5	0.8	0.1	0.0	2.8
MIMAROPA	1.6	0.4	0.4	0.1	0.0	2.5
Region 5	1.6	0.5	0.5	0.1	0.0	2.7
<i>VISAYAS</i>						
Region 6	1.7	0.4	0.6	0.1	0.0	2.8
Region 7	1.8	0.5	0.4	0.1	0.0	2.8
Region 8	1.7	0.5	0.3	0.1	0.0	2.7
<i>MINDANAO</i>						
Region 9	1.9	0.4	0.3	0.1	0.0	2.6
Region 10	1.5	0.5	0.5	0.2	0.0	2.8
Region 11	1.7	0.5	0.4	0.1	0.0	2.7
Region 12	1.7	0.5	0.4	0.1	0.0	2.7
ARMM	1.8	0.5	0.4	0.2	0.1	3.0
CARAGA	1.5	0.5	0.6	0.2	0.1	2.9
<i>PHILIPPINES</i>	1.6	0.5	0.5	0.2	0.0	2.8

Source: FIES 2009, LFS January 2010

Table 7. Non-poor: Mean no. of adults (18+) by education level by region, 2009

Region	Education level					Total
	Elementary and below	HS undergrad	HS grad	College undergrad	College grad	
<i>LUZON</i>						
NCR	0.4	0.3	1.0	0.7	0.7	3.2
CAR	0.8	0.3	0.6	0.6	0.6	2.9
Region 1	0.7	0.3	1.0	0.6	0.5	3.0
Region 2	1.0	0.3	0.7	0.5	0.4	2.9
Region 3	0.8	0.3	1.0	0.5	0.5	3.1
CALABARZON	0.7	0.3	1.0	0.6	0.5	3.1
MIMAROPA	1.0	0.3	0.5	0.5	0.3	2.7
Region 5	0.9	0.4	0.6	0.5	0.5	2.8
<i>VISAYAS</i>						
Region 6	0.9	0.4	0.7	0.5	0.5	3.0

Region 7	0.9	0.4	0.7	0.6	0.6	3.1
Region 8	0.9	0.4	0.5	0.5	0.5	2.8
<i>MINDANAO</i>						
Region 9	0.9	0.4	0.5	0.5	0.5	2.8
Region 10	0.6	0.4	0.7	0.6	0.6	2.9
Region 11	0.8	0.5	0.7	0.5	0.4	2.8
Region 12	0.8	0.4	0.6	0.5	0.4	2.7
ARMM	1.4	0.3	0.4	0.4	0.3	2.9
CARAGA	0.7	0.5	0.7	0.6	0.5	3.0
<i>PHILIPPINES</i>	0.8	0.3	0.8	0.6	0.5	3.0

Source: FIES 2009, LFS January 2010

One may also look at the educational profile of the adult population by age group to see whether among the poor, educational attainment has improved for the younger cohorts. Table 8 provides evidence that, in fact, such improvement has occurred although relatively slowly. Among those over age 65, only half a percent of adults in poor households reached at least incomplete tertiary. This goes up to 4 percent for those from 41-65 years of age, 7.4 percent for those between 25 and 40, and 11 percent for those between 18 and 24. **Among these poor households, those where the young members reach college, and especially if they finish college, are more likely to move out of poverty.**

Contrast these against the non-poor, where the share of those who reached at least incomplete tertiary was 16 percent for those over 65, 30 percent for those from 41-65 years of age, 43 percent for those from 25 to 40, and 46 percent for those between 18 and 24. The gap in college graduates between poor and non-poor households is even wider – 23 percent college graduates among the 25-40 in non-poor households and only 1.6 percent in poor households. Such households and offshoots from these households can be expected to remain non-poor.

Table 8. Poor HHs: Educational Profile of Adult (18+) Population

Age group	Elementary and below	HS undergrad	HS grad	College undergrad	College grad	Total
18-24	37.0	25.6	26.8	9.7	0.9	100.0
25-40	49.9	19.3	23.5	5.8	1.6	100.0
41-65	70.9	12.1	13.1	3.0	0.8	100.0
66+	91.2	5.5	2.8	0.3	0.2	100.0
Total	57.6	17.0	19.0	5.2	1.1	100.0

Source: FIES 2009, LFS January 2010

Table 9. Non-poor HHs: Educational Profile of Adult (18+) Population

Age group	Elementary and below	HS undergrad	HS grad	College undergrad	College grad	Total
18-24	9.6	13.7	30.7	34.4	11.7	100.0
25-40	14.4	10.8	31.6	20.1	23.2	100.0
41-65	33.7	11.2	24.6	14.0	16.4	100.0
66+	63.6	8.1	12.5	5.2	10.6	100.0
Total	25.0	11.3	27.1	19.4	17.1	100.0

Source: FIES 2009, LFS January 2010

Section 3. Income Function

In this section, we use regression analysis to estimate a simple function relating income with human capital, location, and the interaction of human capital and location. The equation is of the form given below.

$$Inc = \alpha_0 + \sum_{i=1}^{16} \beta_i Reg_i + \sum_{j=1}^3 \gamma_j Educ_n_j + \sum_{k=1}^4 \theta_k Mem_n_k + \sum_{i=1}^{16} \sum_{j=1}^3 \delta_{ij} Reg_i Educ_n_j$$

Where *Inc* represents household income, *Reg_i* is a dummy variable for region of residence (with Region 1 as the control group), *Educ_{n_j}* is a variable denoting the number of adults in the household with education level *j* (where *j* ranges from 1 to 3, representing respectively the number of high school graduates, the number college undergraduates, and the number of college graduates in the household), *Mem_{n_k}* is a variable denoting the number of household members in age group *k* (where *k* ranges from 1 to 4, representing respectively the number of those 15 to 24 years old, 25 to 40 years old, 41 to 65 years old, and 66 and over), and *Reg_iEduc_{n_j}* is the interaction between regional location *i* and the education variable *j*. The interaction terms between the education variables and the region variables are intended to capture how much more productive human capital is in some locations relative to others. It is important to note that education here proxies for human capital (other than sheer number of members) in general rather than standing on its own. Obviously this model does not include important unobserved variables that are likely correlated with education level, such as inherent ability and diligence. People with more inherent ability and are more diligent are more likely to reach a higher level of education.

Initially, we estimate a complete model that includes 16 regions (excluding the control region), three educational variables, 4 membership by age group variables, and the 48 interactions between the education and region variables (16 regions times three educational variables). But then we simplify this by excluding all insignificant (at the 10 percent level) interaction terms.

The simplified model is presented in Table 10 below. [The complete model is presented in Annex Table 4.] Note that the model is highly significant and is able to explain 28 percent of the variation in total household income. As expected, it shows evidence that higher human capital gets higher returns, and that, moreover, these returns depend critically on location.³ For example, in the case of Region 1 (the control region), controlling for the number of adults by age group in the household, each additional adult high school graduate in the household is associated with an increase in total household income of about Php16,500. Each additional adult college undergraduate is associated with an additional Php37,900 in total household income, while an additional college graduate is linked with a much-higher additional Php126,500 in total household income. At the extremes, in developed Metro Manila, each additional high school graduate is linked with an additional Php34,500 in total household income, whereas in conflict-ridden ARMM the same does not add anything to total household income. In Metro Manila, each additional college graduate is associated with an additional Php188,000 in total household income, whereas in ARMM the same is linked with only an additional Php53,000. CALABARZON is another location with a high return to human capital, with each additional college graduate being associated with an additional Php175,500 in total household income.

A similar model as in Table 10 but with total household wages and remittances as dependent variable is presented in Table 11. The model has an even higher explanatory power, with the model being able to explain 46 percent of the variation in total household wages and remittances. This suggests that the effect of location and human capital on total household income comes mainly through increased likelihood of finding quality employment (wage and salary jobs and overseas employment).

Table 10. Total Income as a function of location and human capital

Explanatory Variable	Coef.	t	P-value
<i>Location</i>			
Regncr	60,827	5.9	0.000
Regcar	18,369	2.5	0.014
reg2	7,897	1.1	0.270
reg3	29,373	4.3	0.000
regcalaba~on	34,625	4.5	0.000
regmimaropa	-7,715	-1.2	0.244
reg5	-7,209	-1.0	0.313
reg6	-10,003	-1.6	0.104
reg7	-2,628	-0.4	0.707
reg8	-14,588	-2.2	0.029
reg9	-16,345	-2.2	0.030
reg10	-14,331	-1.9	0.056
reg11	3,285	0.5	0.645
reg12	-4,535	-0.6	0.536

³ It is worth mentioning that this simple model passes the Ramsey Test for misspecification.

Regarmm	-3,988	-0.6	0.521
regcaraga	-20,422	-2.5	0.013
<i>Human capital</i>			
age15t24_n	10,476	5.5	0.000
age25t40_n	11,548	5.8	0.000
age41t65_n	16,806	9.7	0.000
age66t99_n	11,066	4.3	0.000
hsg_n	16,496	11.8	0.000
collu_n	37,946	14.8	0.000
collg_n	126,493	34.2	0.000
<i>Interaction between location and human capital</i>			
regncr_hsg_n	18,068	3.0	0.003
regncr_collg_n	61,574	6.9	0.000
regcar_collu_n	-12,404	-1.7	0.100
regcar_collg_n	24,995	2.0	0.045
reg2_hsg_n	-12,642	-3.1	0.002
reg2_collg_n	29,237	1.8	0.074
reg3_collu_n	9,573	1.8	0.078
regcalabarzon_collg_n	49,094	1.7	0.087
reg6_collg_n	-14,465	-2.0	0.046
reg7_collu_n	13,281	2.1	0.036
reg8_collg_n	37,415	1.8	0.068
regarmm_hsg_n	-18,202	-7.0	0.000
regarmm_collu_n	-23,057	-4.5	0.000
regarmm_collg_n	-73,052	-10.6	0.000
_cons	56,793	7.9	0.000
N	=	38400	
F(67, 38332)	=	265.6	
Prob > F	=	0.000	
R-squared	=	0.275	

Source of basic data: FIES 2009

Table 11. Wages and remittances as a function of location and human capital

Explanatory Variable	Coef.	t	P-value
<i>Location</i>			
Regncr	34,655	6.4	0.000
Regcar	-10,171	-3.1	0.002
reg2	-7,190	-2.3	0.020
reg3	12,542	3.8	0.000
regcalaba~on	9,785	2.1	0.037
regmimaropa	-19,086	-7.2	0.000
reg5	-18,787	-7.6	0.000

reg6	-9,371	-3.8	0.000
reg7	-7,998	-2.6	0.010
reg8	-17,677	-5.6	0.000
reg9	-19,283	-7.0	0.000
reg10	-15,437	-5.4	0.000
reg11	-8,307	-2.8	0.005
reg12	-18,000	-6.0	0.000
regarmm	-44,679	-15.0	0.000
regcaraga	-22,514	-7.7	0.000
<i>Human capital</i>			
age15t24_n	8,289	10.7	0.000
age25t40_n	12,466	12.0	0.000
age41t65_n	7,031	6.8	0.000
age66t99_n	-10,079	-7.4	0.000
hsg_n	4,656	4.7	0.000
collu_n	29,457	18.1	0.000
collg_n	61,504	17.7	0.000
<i>Interaction between location and human capital</i>			
regncr_hsg_n	16,803	5.3	0.000
regncr_collg_n	64,600	9.9	0.000
regcar_collu_n	-13,766	-3.1	0.002
regcar_collg_n	34,486	4.2	0.000
reg2_hsg_n	-5,083	-2.3	0.023
reg2_collu_n	-17,460	-4.2	0.000
reg2_collg_n	25,862	3.4	0.001
reg3_hsg_n	6,995	3.4	0.001
reg3_collg_n	27,349	4.6	0.000
regcalabarzon_hsg_n	14,690	5.1	0.000
regcalabarzon_collg_n	56,929	7.4	0.000
regmimaropa_collu_n	-10,500	-2.7	0.008
regmimaropa_collg_n	34,866	4.3	0.000
reg5_collu_n	-11,315	-3.0	0.003
reg5_collg_n	22542	3.36	0.001
reg6_collu_n	-13170.56	-3.86	0.000
reg6_collg_n	23625.9	3.5	0.000
reg7_hsg_n	10619.67	4.01	0.000
reg7_collg_n	26383.9	4.15	0.000
reg8_collu_n	-19376.05	-4	0.000
reg8_collg_n	42310.9	6.1	0.000
reg9_collu_n	-19745.05	-4.38	0.000
reg9_collg_n	28548.57	3	0.003
reg10_collu_n	-11687.1	-2.64	0.008
reg10_collg_n	35532.94	5.2	0.000

reg11_hsg_n	6437.342	2.44	0.015
reg11_collu_n	-6775.879	-1.77	0.077
reg11_collg_n	13917.3	2.18	0.029
reg12_collg_n	34151.78	4.24	0.000
regarmm_hsg_n	-4928.051	-2.54	0.011
regarmm_collu_n	-28208.5	-7.55	0.000
regcaraga_collu_n	-11994.16	-2.68	0.007
regcaraga_collg_n	25666.14	2.7	0.007
_cons	27,483	10.2	0.000
N	=	38400	
F(67, 38332)	=	249.5	
Prob > F	=	0.000	
R-squared	=	0.463	

Source of basic data: FIES 2009

Section 4. Poverty Persistence

In this section, we use panel data from 2004 to 2008 to analyse the inter-temporal link between human capital and poverty. The panel consists of 7,574 households tracked by the National Statistics Office in their Annual Poverty Indicators Surveys (APIS) for the years 2004, 2007, and 2008. [The 7,574 households were a subset of the total households surveyed in each year, which were usually in the 40,000 range.] For this exercise, we use the national-level official poverty line for all households appropriately deflated by the overall consumer price index.⁴

Table 12 shows poverty incidence by education level of the most educated adult household member, using per capita expenditure as the measure of income.⁵ It shows that across the years, more than half of the households where the most educated member was at most an elementary graduate in 2004 were classified as poor. Households where the most educated adult member in 2004 was a high school undergraduate fared little better, with poverty incidence across the years close to half. There's a steep fall in poverty incidence when the high school graduate households are considered (31 to 35 percent poverty incidence), and a further substantial decline when college undergraduate households are examined (18 to 20 percent poverty incidence). College graduate households had poverty incidence of only from 6 to 7 percent across the three survey years. Table 13 is similar to Table 12 but uses per capita income instead of per capita expenditure as measure of welfare, and shows that the results hold whether income or expenditure is used.

Table 12. Poverty Incidence (based on expenditure) by Education of

⁴ The official national-level poverty line in 2009 was Php8,448 in 2009. After deflating by CPI, the resulting poverty lines for 2004, 2007, and 2008 were Php8,184, Php7,487, and Php 6,373, respectively.

⁵ Expenditure has been said to be a better measure of welfare than income because it corresponds more closely to permanent income.

Most Educated Adult HH Member, 2004 to 2008 Panel

Education level of Most educated member in 2004	2004	2007	2008	# of HHs
Elementary and below	55.1	57.1	50.5	1,829
HS undergrad	49.0	53.5	48.4	946
HS grad	34.3	35.1	30.5	1,916
College undergrad	18.9	19.6	17.7	1,345
College grad	6.8	6.8	6.0	1,538
Total	32.9	34.2	30.3	7,574

Source: NSO's APIS 2004, 2007, and 2008 panel data

Table 13. Poverty Incidence (based on income) by Education of Most Educated Adult HH Member, 2004 to 2008 Panel

Education level of Most educated member in 2004	2004	2007	2008	# of HHs
Elementary and below	55.1	55.3	48.7	1,829
HS undergrad	48.8	51.3	46.7	946
HS grad	34.5	32.9	30.2	1,916
College undergrad	19.2	21.0	18.4	1,345
College grad	5.9	5.8	6.0	1,538
Total	32.7	33.0	29.7	7,574

Source: NSO's APIS 2004, 2007, and 2008 panel data

Using panel data, it is possible to examine the extent of chronic (or persistent) poverty. A household is chronic poor (as opposed to transient poor) if it is consistently classified as poor. The alternative is if the household is transient poor, which is the case if it only experiences temporary bouts of poverty. Using our data, we classify a household as chronic poor if it was poor in 2004 and also poor in 2008. If it was poor in only one year, then it is classified as transient poor.

Table 14 shows the poverty transition matrix for households where the most educated member was an elementary graduate or lower in 2004. The table shows that 40 percent of such households were chronically poor (or poor in both 2004 and 2008), 15 percent were poor only in 2004, and 11 percent were poor only in 2008. If one divides the share of the chronic poor by the baseline share of the total poor, we get a measure of the likelihood of the poor remaining poor. For these households where

the most educated member was an elementary graduate or lower in 2004, the share of the poor households who remained poor in 2008 is 71.6 percent (40 divided by 55).

Table 14. Poverty Transition for HHs whose Most Educated Member is an Elementary Graduate or lower in 2004

Poverty Status	Non-poor in		Total
	2008	Poor in 2008	
Non-poor in 2004	0.34	0.11	0.45
Poor in 2004	0.15	0.40	0.55
Total	0.49	0.51	1.00

*Figures in table are proportions to total household population whose Most Educated Member is an Elementary Graduate or lower (w/c totaled 1,829 in 2004).

Source: NSO's APIS 2004, 2007, and 2008 panel data

The poverty transition matrix for high school undergraduate households is shown in Table 15. It shows that 33 percent of the group were chronic poor, 16 percent poor only in 2004, and 15 percent poor only in 2008. The share of poor households in 2004 who remained poor in 2008 for high school undergraduate households is 67.7 percent (0.33/0.49). For high school graduate households, the poverty transition matrix is presented in Table 16. It shows that 20 percent of the group is chronic poor, 14 percent poor only in 2004, and 11 percent poor only in 2008. The share of poor households in 2004 who remained poor in 2008 for high school graduate households is 58.1 percent (0.20/0.34).

Table 15. Poverty Transition for HHs whose Most Educated Member is a High School Undergraduate in 2004

Poverty Status	Non-poor in		Total
	2008	Poor in 2008	
Non-poor in 2004	0.36	0.15	0.51
Poor in 2004	0.16	0.33	0.49
Total	0.52	0.48	1.00

*Figures in table are proportions to total household population whose Most Educated Member is a high school undergraduate (w/c totaled 946 in 2004).

Source: NSO's APIS 2004, 2007, and 2008 panel data

Table 16. Poverty Transition for HHs whose Most Educated Member is a High School Graduate in 2004

Poverty Status	Non-poor in		Total
	2008	Poor in 2008	
Non-poor in 2004	0.55	0.11	0.66
Poor in 2004	0.14	0.20	0.34

Total	0.69	0.31	1.00
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*Figures in table are proportions to total household population whose Most Educated Member is a high school graduate (w/c totaled 1,916 in 2004).

Source: NSO's APIS 2004, 2007, and 2008 panel data

The poverty transition matrix for college undergraduate households is shown in Table 17. The chronic poverty incidence for the group is only 9 percent, about the same as the transient poverty incidence (10 percent in 2004 and 8 percent in 2008). The share of poor households in 2004 who remained poor in 2008 for college undergraduate households is 49.2 percent (0.09/0.19). For college graduate households, the poverty transition matrix is presented in Table 18. It shows that only 3 percent of the group is chronic poor and about the same percentage transient poor (4 percent in 2004 and 3 percent in 2008). The share of poor college graduate households in 2004 who remained poor in 2008 is 47.6 percent (0.3/0.7). Tables 14 to 18 clearly show that poverty is more persistent (or chronic) for households with a lower level of human capital.

Table 17. Poverty Transition for HHs whose Most Educated Member is a College Undergraduate in 2004

Poverty Status	Non-poor in		Total
	2008	Poor in 2008	
Non-poor in 2004	0.73	0.08	0.81
Poor in 2004	0.10	0.09	0.19
Total	0.82	0.18	1.00

*Figures in table are proportions to total household population whose Most Educated Member is a college undergraduate (w/c totaled 1,345 in 2004).

Source: NSO's APIS 2004, 2007, and 2008 panel data

Table 18. Poverty Transition for HHs whose Most Educated Member is a College Graduate in 2004

Poverty Status	Non-poor in		Total
	2008	Poor in 2008	
Non-poor in 2004	0.90	0.03	0.93
Poor in 2004	0.04	0.03	0.07
Total	0.94	0.06	1.00

*Figures in table are proportions to total household population whose Most Educated Member is a college graduate (w/c totaled 1,538 in 2004).

Source: NSO's APIS 2004, 2007, and 2008 panel data

Finally, we estimate a panel data model with income poverty as dependent variable and location and household membership and human capital as explanatory variables. The results in Table 19 show, that as expected that the likelihood of a household being poor is higher in some regions relative to others, even after controlling for household human capital. Moreover, the table shows that controlling for the number of adult members, the more college undergraduates and especially college graduates among them, the lower their odds of being poor. On the other hand, the more high school graduate adults among households the higher their odds of being poor. The significant interaction variables in the table indicate that the effect of additional human capital on the probability of being poor also varies across regions (the effect of additional college graduates lowers it substantially in the case of Calabarzon and Region 7, for example).

Table 19. Probability of being poor as a function of location and human capital: Panel data estimation (random effects logit)

Explanatory Variable	Odds Ratio	z	P>z
<i>Region</i>			
regncr	0.06	-8.30	0.000
regcar	2.65	3.89	0.000
reg2	1.88	2.62	0.009
reg3	0.51	-2.91	0.004
regcalabarzon	0.86	-0.66	0.509
regmimaropa	5.81	7.30	0.000
reg5	3.60	5.76	0.000
reg6	2.43	4.09	0.000
reg7	2.96	5.02	0.000
reg8	5.38	7.44	0.000
reg9	11.13	10.03	0.000
reg10	5.50	7.05	0.000
reg11	4.70	6.83	0.000
reg12	5.93	7.80	0.000
regarmm	4.78	6.93	0.000
regcaraga	7.08	8.17	0.000
<i>HH membership</i>			
age6t11_n	2.13	25.58	0.000
age12t15_n	1.67	14.30	0.000
age16t99	1.08	3.77	0.000
<i>HH human capital</i>			
hsu_n	1.11	3.01	0.003
hsg_n	0.91	-1.09	0.277
collu_n	0.45	-4.39	0.000

collg_n	0.35	-4.71	0.000
<i>Interaction between region and HH human capital</i>			
regncr_hsg_n	1.28	1.51	0.130
regncr_collu_n	1.06	0.19	0.850
regncr_collg_n	1.22	0.51	0.611
regcar_hsg_n	0.93	-0.49	0.623
regcar_collu_n	0.93	-0.25	0.800
regcar_collg_n	0.57	-1.56	0.120
reg2_hsg_n	0.70	-2.18	0.029
reg2_collu_n	0.79	-0.85	0.395
reg2_collg_n	0.68	-1.13	0.258
reg3_hsg_n	0.91	-0.75	0.454
reg3_collu_n	0.87	-0.52	0.606
reg3_collg_n	0.60	-1.27	0.203
regcalabarzon_hsg_n	0.80	-1.70	0.090
regcalabarzon_collu_n	0.72	-1.18	0.237
regcalabarzon_collg_n	0.21	-2.83	0.005
regmimaropa_hsg_n	0.73	-1.95	0.051
regmimaropa_collu_n	0.80	-0.78	0.436
regmimaropa_collg_n	0.30	-2.50	0.012
reg5_hsg_n	0.90	-0.75	0.454
reg5_collu_n	0.88	-0.49	0.625
reg5_collg_n	0.30	-3.02	0.003
reg6_hsg_n	0.99	-0.09	0.926
reg6_collu_n	0.82	-0.81	0.419
reg6_collg_n	0.57	-1.67	0.095
reg7_hsg_n	0.69	-2.64	0.008
reg7_collu_n	0.90	-0.40	0.688
reg7_collg_n	0.22	-3.62	0.000
reg8_hsg_n	0.70	-2.10	0.035
reg8_collu_n	0.75	-1.04	0.297
reg8_collg_n	0.51	-1.99	0.046
reg9_hsg_n	0.77	-1.51	0.131
reg9_collu_n	0.52	-2.23	0.026
reg9_collg_n	0.25	-3.35	0.001
reg10_hsg_n	0.92	-0.63	0.531
reg10_collu_n	1.21	0.74	0.458
reg10_collg_n	0.39	-2.70	0.007
reg11_hsg_n	0.70	-2.34	0.019
reg11_collu_n	0.66	-1.42	0.155
reg11_collg_n	0.28	-2.94	0.003
reg12_hsg_n	0.82	-1.40	0.162
reg12_collu_n	1.23	0.86	0.392

reg12_collg_n	0.53	-1.74	0.082
regarmm_hsg_n	1.37	1.83	0.067
regarmm_collu_n	1.65	2.10	0.036
regarmm_collg_n	0.85	-0.47	0.640
regcaraga_hsg_n	0.93	-0.46	0.647
regcaraga_collu_n	0.89	-0.44	0.660
regcaraga_collg_n	0.63	-1.26	0.209
<i>Year effects</i>			
y2007	1.23	3.78	0.000
y2008	0.91	-1.68	0.092
/lnsig2u	0.950		
sigma_u	1.608		
rho	0.440		
Number of obs	22722		
Number of groups	7574		
Wald chi2(73)	2577.6		
Prob > chi2	0.000		

Source of basic data: NSO APIS 2004, 2007, 2008

Section 5. Summary findings and their policy implications

The paper asks who are poor and do they remain poor. To answer the first part of the question, we use regression analysis to estimate a simple family income function with human capital and location as major explanatory variables. Most studies use the education of the household head as a proxy for human capital. Considering a prevalent practice of income sharing by family members, we used the education of the member with the highest education attainment instead of the education of the head as the family education indicator. In 2008, the poverty rate of families whose most educated member had some elementary education was 50.5% in comparison to the poverty rate of families with college graduate member, 6.0%. The geographic diversity of the land leads to significant variation in the productivity of labor and other productive inputs. The poverty rate by education is higher in poor regions than in richer regions. The poverty rate in 2009 ranged from 2.6% in the Metro Manila to 39.7% in Caraga. We include regional location of the household and the interaction of education and location in the regression of family income. The regression runs gave the expected results with education as the principal determinant of income and the location and education-location interactions contributing to the variation in family income. Families in underdeveloped and poorly endowed areas suffer most from not getting educated. The regression results of the income function explain the observed variation in poverty incidence across regions and provinces.

Panel data were used to see changes in the poverty rate of families by their education and location. In most regions, poverty rate declined but differentially. Generally the poverty rate in provinces surrounding central or leading cities and with favourable climate enjoyed higher rate of poverty reduction. The people in the very remote region of Muslim Mindanao which have suffered

serious political instability have become poorer through time. We find that relatively fewer of the least educated families escape their poor situation from 2004 to 2008. Of the poor families with only elementary education in 2004, 71.6 remained poor in 2008. The proportion of poor families in 2004 who escaped poverty by 2008 increases as their education increases. Among the poor with completed high school education, 58.8% remained poor. The corresponding figure for the college graduates was 20.3% (given only 3% of them were poor in 2008).

The regression results of the income function identified the poor to be low educated in remote underdeveloped locations. The poverty rate among them is high. The data lead to questions why there are still so many low educated people and why the very large differential in average income and poverty rate between regions. The government has tried to establish elementary schools in all municipalities and villages. High school is highly subsidized directly through the public high school system and the voucher for tuition in private high schools for students who could not be accommodated in existing public high schools. Yet more than 10% of primary grade children are not enrolled and the participation rate in high school is less than 70%. Remote areas are not breached by reasonably priced transport and little is done for improving the productivity of their agriculture, fishing and other activities. These areas are segmented from the main markets and they tend to face lower prices for their outputs and higher prices for goods and social services produced in distant leading cities. The poor in these areas are too poor to finance migration to areas with better employment opportunities beside the fact that they have no qualifications for available jobs. Most factory jobs in large enterprises require high school education. The study calls for developing strategies that would address the geographic isolation of areas where serious poverty has persisted. Offhand, they need good transport system that would link them to the nearest central cities, access to information on and supply of productivity enhancing technologies for their livelihood, whether agriculture, fishing or tourism, and access to good quality high school education. These would raise the productivity of their labor and resources and allow them to acquire human capital and capacity to migrate. The MDG goals would be difficult to achieve without addressing the inequality of social and economic development of rural areas, especially the remote ones.

References

- Alba, M. 2002. 'The distribution and structure of wages and their implications on gender and inter-industry wage differentials. Background paper prepared for the Philippine Human Development Report 2002.
- Balisacan, A. and N. Fuwa. 2004. 'Going beyond Crosscountry Averages: Growth, Inequality and Poverty Reduction in the Philippines'. *World Development*, Elsevier vol. 32(11), pages 1891-1907.
- Balisacan, A. 2007. 'Why Does Poverty Persist in the Philippines: Facts, Fancies, Policies?'. SEARCA Agriculture and Development Discussion Paper Series No. 2007-1.
- Ducanes, G. 2011. 'The Welfare Impact of Overseas Migration on Philippine Households: a critical review of past evidence and an analysis of new panel data evidence'. PhD Dissertation in the UP School of Economics.
- Haughton, J. and S. Khandker. 2009. *Handbook on Poverty and Inequality*. World Bank.
- Human Development Network. 2013. '2012/13 Philippine Human Development Report: Geography and Human Development'. Human Development Network.
- Philippine Institute for Development Studies and UNICEF. 2010. Global Study on Child Poverty and Disparities.
- Reyes, C., A. Tabuga A., C. Mina, R. Asis, and M. Datu. 2011. 'Dynamics of Poverty in the Philippines: Distinguishing the Chronic from the Transient Poor'. Makati: Philippine Institute for Development Studies.
- Tan, E.A., K. Canales, K. Cruz, and J.C. Punongbayan. 2011. 'Why are boys falling behind girls in schooling?'. University of the Philippines School of Economics Discussion Paper No. 2011-12.
- World Bank. 1993. *The East Asian Miracle: Economic Growth and Public Policy*. New York: Oxford University Press.

Annex 1

The usual measure of household human capital is the education of the household head, especially for purposes of constructing cross-tabulations by education. But this tends to understate the human capital of the households because the identified head is often one of the older household members but not necessarily the most employable and the most educated. It is the case that educational attainment has generally improved over the years so that younger adults are more likely to be better educated than older adults in the same household. Using the education of the household head will especially tend to misclassify households where the head (say the parent) was not well-educated, but was able to provide his or her children better education. Annex Table 1 shows poverty incidence by education of the household head. In contrast to Table 2, clearly more households fall into the category *elementary and below* and lower poverty is measured for the lower education categories. A better contrast of poverty incidence is seen across educational levels using the most educated member measure.

Annex Table 1. Poverty by Education of household head, 2009

Education level of household head	Poverty Incidence	Contribution to total poverty	Total # of HHs
Elementary and below	33.9	68.9	7,793,678
HS undergrad	24.2	13.8	2,182,742
HS grad	12.5	13.7	4,189,105
College undergrad	5.4	3.1	2,202,679
College grad	1.1	0.6	2,083,337
Total	20.8	10.7	18,451,541

Source: FIES 2009, LFS January 2010

Annex Table 2. Poverty by Education of Most Educated Member, 2006

Education level of Most educated member	Poverty Incidence	Contribution to total poverty	Total # of HHs
Elementary and below	40.7	47.5	4,245,185
HS undergrad	33.8	19.2	2,063,648
HS grad	21.0	24.2	4,183,512
College undergrad	9.0	6.7	2,725,907
College grad	2.4	2.4	3,710,127
Total	21.5	100.0	16,928,379

Source: FIES 2006, LFS January 2007

Annex Table 3. Poverty Incidence by Education of Most Educated Member, 2006

Region	Education level of most educated member					Total
	Elementary and below	HS undergrad	HS grad	College undergrad	College grad	
<i>LUZON</i>						
NCR	9.1	11.0	4.8	2.3	0.6	3.5
CAR	34.9	37.2	20.7	17.9	2.3	19.9
Region 1	28.6	35.7	29.3	9.3	3.2	20.5
Region 2	24.9	24.2	18.3	4.7	1.5	15.2
Region 3	23.3	23.4	13.6	5.3	1.5	12.5
CALABARZON	24.8	18.9	11.1	3.8	0.4	10.2
MIMAROPA	48.5	42.1	31.4	17.4	4.0	33.1
Region 5	51.3	45.6	42.7	19.2	3.8	36.8
<i>VISAYAS</i>						
Region 6	35.3	34.3	22.7	8.5	3.0	21.5
Region 7	54.0	44.2	33.4	13.5	3.2	32.3
Region 8	44.3	40.3	28.0	16.2	4.3	30.4
<i>MINDANAO</i>						
Region 9	60.1	48.2	31.7	12.0	3.2	37.2
Region 10	54.1	46.2	34.9	13.6	5.2	31.7
Region 11	48.5	33.3	22.5	8.6	1.1	25.8
Region 12	44.3	36.3	29.7	16.1	2.0	27.9
ARMM	43.9	42.6	35.3	24.3	12.6	37.0
CARAGA	55.8	44.0	33.0	20.0	8.6	34.4
<i>PHILIPPINES</i>	41.1	34.0	21.2	9.0	2.4	21.6

Source: FIES 2006, LFS January 2007

Annex Table 4. Total Income as a function of location and human capital (Full)

Explanatory Variable	Coef.	t	P-value
<i>Location</i>			
regncr	47,070	4.30	0.000
regcar	8,795	0.90	0.367
reg2	1,904	0.22	0.826
reg3	23,640	2.88	0.004
regcalabarzon	22,345	2.37	0.018
regmimaropa	-12,440	-1.57	0.117
reg5	-22,618	-1.92	0.055
reg6	-15,289	-1.91	0.056
reg7	-13,776	-1.62	0.104
reg8	-37,917	-2.26	0.024
reg9	-27,444	-3.39	0.001
reg10	-26,103	-3.12	0.002
reg11	-11,863	-1.44	0.150
reg12	-14,765	-1.81	0.070
regarmm	-14,633	-1.86	0.063
regcaraga	-29,876	-3.53	0.000
<i>Human capital</i>			
age15t24_n	10,467	5.48	0.000
age25t40_n	11,647	5.80	0.000
age41t65_n	17,032	9.77	0.000
age66t99_n	11,068	4.24	0.000
hsg_n	7,209	2.16	0.031
collu_n	43,403	3.80	0.000
collg_n	116,742	6.30	0.000
<i>Interaction between location and human capital</i>			
regncr_hsg_n	27,725	4.26	0.000
regncr_collu_n	-1,637	-0.13	0.893
regncr_collg_n	71,170	3.52	0.000
regcar_hsg_n	7,599	1.26	0.208
regcar_collu_n	-17,907	-1.34	0.180
regcar_collg_n	34,555	1.58	0.115
reg2_hsg_n	-3,589	-0.74	0.461
reg2_collu_n	-18,481	-1.29	0.196
reg2_collg_n	41,060	1.66	0.097
reg3_hsg_n	6,939	1.80	0.072
reg3_collu_n	4,942	0.40	0.688
reg3_collg_n	2,175	0.11	0.912
reg41_hsg_n	12,055	2.27	0.023

reg41_collu_n	-7,978	-0.51	0.608
reg41_collg_n	59,662	1.72	0.085
reg42_hsg_n	1,303	0.30	0.762
reg42_collu_n	-8,589	-0.71	0.480
reg42_collg_n	6,710	0.33	0.742
reg5_hsg_n	20,630	1.43	0.152
reg5_collu_n	-8,940	-0.66	0.507
reg5_collg_n	7,420	0.37	0.715
reg6_hsg_n	3,920	1.00	0.319
reg6_collu_n	-9,655	-0.81	0.420
reg6_collg_n	-4,435	-0.23	0.820
reg7_hsg_n	10,876	2.31	0.021
reg7_collu_n	8,035	0.64	0.525
reg7_collg_n	8,356	0.40	0.687
reg8_hsg_n	44,993	1.54	0.123
reg8_collu_n	-17,439	-1.28	0.199
reg8_collg_n	50,504	1.80	0.071
reg9_hsg_n	5,795	0.86	0.389
reg9_collu_n	-14,064	-1.03	0.304
reg9_collg_n	24,989	1.10	0.270
reg10_hsg_n	-676	-0.14	0.892
reg10_collu_n	8,371	0.57	0.572
reg10_collg_n	10,878	0.54	0.592
reg11_hsg_n	15,478	3.09	0.002
reg11_collu_n	-6,568	-0.52	0.603
reg11_collg_n	13,461	0.60	0.548
reg12_hsg_n	1,505	0.31	0.758
reg12_collu_n	-1,908	-0.15	0.882
reg12_collg_n	18,695	0.84	0.400
regarmm_hsg_n	-8,945	-2.37	0.018
regarmm_collu_n	-28,565	-2.35	0.019
regarmm_collg_n	-63,337	-3.26	0.001
regcaraga_hsg_n	3,323	0.55	0.583
regcaraga_collu_n	-14,391	-1.14	0.254
regcaraga_collg_n	30,055	1.26	0.209
_cons	67,148	8.73	0.000
N	=	38400	
F(67, 38332)	=	174.8	
Prob > F	=	0.000	
R-squared	=	0.276	

Source of basic data: FIES 2009