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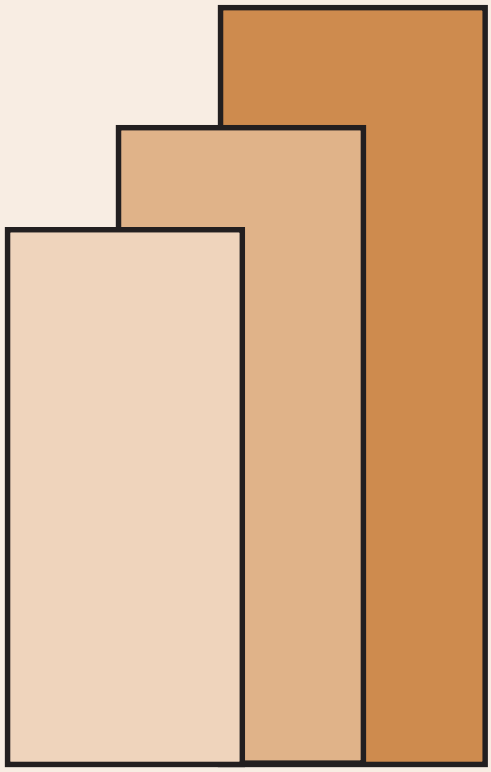

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Toward Measuring Household Vulnerability to Income Poverty in the Philippines[♦]

Jose Ramon G. Albert,[μ] *Lilia V. Elloso*[*] *and Andrei Philippe Ramos*[∂]

Abstract: Concomitant to the analysis of poverty is the measurement of vulnerability. Estimates of household vulnerability to income poverty are developed using a modified probit model that considers volatilities in income as being explained by some household characteristics. Resulting vulnerability estimates are found to be higher than poverty rates, suggesting that policy interventions will have to be developed to minimize the risk households face in becoming income poor, or at least help them in mitigating the impact of their becoming poor.
Keywords: poverty, vulnerability

I. INTRODUCTION

The importance of poverty measurement and analysis lies in the ever growing interest to highlight the poor in the public policy agenda. In addition, there is recognition that management of poverty policies and programs are more effectively done with the aid of poverty data. In particular, interventions have to be properly targeted and their effects measured. Many countries are thus releasing official poverty statistics either through the in house capacities of their statistical offices, or with the aid of development partners. In the Philippines, official poverty statistics have been generated by the Philippine Statistical System since 1987 and these statistics are regularly released every three years whenever data is available from the Family Income and Expenditure Survey (FIES).

Although poverty is multi-dimensional, its measurement is often operationalized by analyzing a monetary welfare indicator such as income or consumption, setting a poverty line and aggregating the poverty data. Regardless of the welfare indicator chosen, poverty is measured ex post. In consequence, poverty studies focus on households that are currently in poor, or were poor in the past. That poverty is measured ex post has its merits since the effects of past government interventions can be measured using actual data. In addition, poverty analysis can involve putting an actual face to the poor, and looking into what they will require either for their short term needs or for empowering them to exit from poverty.

From a policy perspective, it is also important to help households that are at risk of becoming poor and households already poor who are likely to stay poor. These households need to be provided social safety nets and other interventions that may minimize the likelihood that they will be poor in the future. For such ends, it would be valuable to identify households who are expected to be poor *ex ante*, and we consider these households to be *vulnerable to poverty*.

[♦] Views and results expressed in this paper are those of the authors and do not necessarily represent the institutions they belong to.

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Vulnerability has an intrinsic and instrumental perspective: one cannot limit the definition of welfare to the present actual welfare status but must account for prospects of well being in the future. (Dercon, 2001). Some non-poor households are vulnerable to weather disturbances and economic shocks (see Tabunda and Albert, 2002), bad harvests, a lost job or an illness by the major income earner in a household, or an unexpected expense that could easily push them into poverty. In some cases, the damage may even be irreparable, or lead households to adopt coping mechanisms that can lead them into a vicious cycle of self-perpetuating poverty.

Currently, there is wide variation in how poverty is measured: from the choice of the welfare indicator (and adjustments to account for economies of scale and the needs of the members of the household), to the method for setting the poverty line, to the use of specific poverty measures for aggregating the poverty data and thus describing the poverty situation. The measurement of vulnerability is even more contentious as the concept of vulnerability involves looking into future income or consumption of the household. Income and consumption dynamics and variability can, however, be proxy indicators for vulnerability. Chaudhuri (2000) provided a methodology for measuring and analyzing vulnerability from cross-sectional surveys. Chaudhuri and Datt (2001) applied this framework to Philippine data, specifically using consumption data and other information from the 1997 FIES, as well as the poverty lines of Balisacan (1998). In the following section, we review some of the literature on vulnerability. In section three, we discuss how we adapted the Chaudhuri (2000) methodology on income per capita data, and using the official poverty lines. The modeling of income per capita may be more sensible given the volatility of income (relative to expenditure). Section four provides a profile of vulnerability in the Philippines based on such an approach, and a validation of the empirical results by looking into income dynamics of panel households interviewed for the 1997 FIES and for the 1998 and 1999 rounds of the Annual Poverty Indicator Survey (APIS). The final section gives a summary of the results of this study, and some recommendations.

II. REVIEW OF LITERATURE

Over the years, a number of studies have provided a conceptual framework of vulnerability to poverty, and/or to measure it. Table 1 below from Dercon (2001) provides a framework for analyzing vulnerability to poverty and shows the importance of assets, in terms of its links with risk and vulnerability.

Table 1. A Framework for Analyzing Vulnerability to Poverty.

Assets	*Incomes*	*Well-being/capabilities*
• human capital, labor • physical/financial capital • Commons and public goods • Social capital	• Returns to activities and assets • Returns from asset disposal • Savings, credit, investment • Transfers & remittances	Ability to obtain • Consumption • Nutrition • Health • Education
Examples of risk (a)	*Examples of risk (b)*	*Examples of risk (c)*
• Loss of skills due to ill health or unemployment • Land tenure insecurity • Asset damage due to climate, war, disaster	• Output falls due to climatic shocks, disease, conflict • Output prices rise • Reduced returns on	• Price risk in food markets • Food availability/rationing • Uncertain quality of public provision in health

• Uncertain access to commons, public goods • Loss of value of financial assets	financial assets • Uncertain cash flow during production • Weak contract enforcement, wages not paid • Imperfect information about opportunities	and education • Imperfect information on how to achieve good health, nutrition

Source: Based on Dercon (2001), p.17.

Household assets, such as land, labor, as well as physical, human and social capital are deployed to generate income, which, in turn, is used to generate well-being, largely through consumption. But, households face risks at every stage of the process. Assets face the risk of degradation if there is war, or uncertain land tenure, or a theft. Incomes face the risk of being reduced if there is a drought or if output prices fall. Well being may also be at risk: the ability to consume may be reduced if the cost of food rises or if food is rationed. An implication of such a framework is that policies aimed at reducing household vulnerability to poverty ought to be geared toward raising the average level of well-being of households, in the same way that any poverty reduction strategy program would attempt to do. In addition, such polices also ought to focus on mitigating risk and its consequences, essentially through social protection mechanisms such as safety nets and insurance. Safety nets, by their very nature, are temporary interventions, and their life will have to be dependent on a constant monitoring of the effects of these interventions.

Heitzmann, Caganarajah, and Seigel (2002), similarly suggest the importance of assets in reducing vulnerability to poverty but through the paradigm of a "risk chain." This framework, involves decomposing household vulnerability into several components: (1) risk (or uncertain events); (2) options for managing risk (or risk responses), and (3) the outcome (in terms of the resulting welfare loss).

In the literature, we also find various approaches to the measurement of vulnerability. Traditional attempts to measure vulnerability consider the use of panel data, and the analysis of poverty transitions, i.e., movements in and out of poverty. In the Philippines, Tabunda and Albert (2002), for instance, analyze the vulnerability of per capita incomes of 11,723 panel households (interviewed for the 1997 FIES and the 1998 APIS) in the wake of the Asian financial crisis and the El Niño phenomenon. They look into the use of a CART (Classification and Regression Trees) model to identify households that considerably changed their income quintile status within one year. They report that vulnerable households are those with large households sizes and those whose heads work in agriculture. A recently-released study (see NSCB, 2005) also works on these panel data but builds a probit model of the income of the panel households in 1998 using covariates representing household characteristics of the panel in 1997. Unfortunately, while panel data can provide a rich source of information on poverty dynamics, such data are hard to design and to collect. In fact, the current master sample design of household surveys conducted by the National Statistics Office (NSO) does not plan for collection of panel households per se.

Another approach in measuring vulnerability involves the use of repeated cross sectional data, i.e., surveys with respondents drawn from the same sampling frame, with cluster panels subsequently created. Christaensen and Subbarao (2001), for instance, examine the 1994 and 1997 Welfare Monitoring Surveys (WMS) of Kenya. They constructed a vulnerability profile of Kenya by way of a regression model that estimate the coefficients of the determinants of the ex ante mean and variance of each cluster's average per adult equivalent household consumption in

1997 based on its average household and locality characteristics in 1994. Three categories of covariates were considered: risk factors, risk exposure, and coping capacity, with the analysis covering separately non-arid and arid/semi-arid areas. They also compute different statistics based on variants of the Foster-Greer-Thorbecke family of poverty measures, viz., the expected gap, the conditional expected gap, and the normalized expected gap squared.

Another study by Ligon and Schecter (2002) considers vulnerability as the sum of both losses due to poverty and losses due to risk exposure; they estimate vulnerability by employing monthly data from the Household Budget Survey in Bulgaria, collected over 12 months. They divide idiosyncratic risk into three parts: risk arising from variation in the income stream, from changes in the number of pensioners in each household, and from the number of unemployed persons in the household. They also attempt to measure the contribution of various components of the vulnerability measure to overall vulnerability, using both total consumption and food consumption. Their results suggest that, for both measures, poverty is the largest single component of vulnerability. Unexplained risk is the second largest component, and aggregate risk is the third largest component. Thus aggregate risks are more important than idiosyncratic sources of risk. They then regress each element of vulnerability on a set of observable household characteristics and find that households headed by an employed, educated male are less vulnerable to aggregate shocks than are other households. They also find that the correlates of vulnerability (and aggregate risk) are extremely similar to the correlates of poverty.

Other approaches to vulnerability measurement involve the use of cross-sectional data. Tesliuc and Lindert (2002), for instance, perform a vulnerability assessment in Guatemala using a single cross-section survey, viz., the 2000 a Living Standards Measurement Study (ENCOVI), combined with a qualitative study of poverty and exclusion conducted in 10 villages in Guatemala to provide a wealth of information on risks and coping mechanisms. The ENCOVI, in particular, included a risks and shocks module, in which households were asked to report if they had experienced a shock during the previous 12 months, using pre-coded questions for 28 economic, natural, social/political, and life-cycle shocks, which were classified *ex ante* into covariant and idiosyncratic shocks. Households also reported whether these shocks triggered a reduction or loss of their income or wealth, as well as the main strategy that they used to cope with their welfare loss. In addition, they reported if they had succeeded in reversing the reduction or loss in their welfare by the time of the survey, and if so, the estimated time that had elapsed until successful resolution of the situation.

III. DATA AND METHODOLOGY

By way of extension of the Dercon (2001) framework, we can investigate vulnerability to poverty using the approach of Chaudhuri (2000) but with the operational definition of vulnerability based on income per capita (rather than consumption per capita) sourced from the 1997 FIES. Unlike Chaudhuri (2000), we utilize the official poverty lines (across the urban-rural areas in each region) released by the National Statistical Coordination Board (NSCB) for 1997. The FIES is a cross sectional household survey conducted every three years by the NSO in order to gather information on the sources of income, the distribution of income, levels of spending patterns and the degree of inequality among families. The 1997 FIES is based on a nationally representative sample of 39,520 households.

Adapting the methodology of Chaudhuri (2000) to income data, we define the vulnerability level of a household h at time t as the probability that the household will find itself income poor at time t + 1:

$$V_{ht} = \Pr(Y_{h,t+1} \leq Z_h) \qquad (a)$$

where $Y_{h,t+1}$ is the household's per capita income level at time t + 1 and Z_h is the appropriate poverty line (for the household). The issue here is that the vulnerability level is not directly observable, since it represents our expectation of the household's income per capita in the next time period t + 1. Although a household's level of income next year is not known, it may be possible to arrive at a reasonable estimate of this level by building a model of the determinants of income and then using the model to predict next time period's income.

Still following Chaudhuri (2000) but adapting the methodology to income per capita, we assume that income can be modeled as follows:

$$\ln Y_h = X_h \beta + e_h \qquad (b)$$

where Y_h is per capita income of household h, X_h represents a bundle of observable household characteristics such as household size, location, educational attainment of the household head, etc. that serve as explanatory variables of per capita income, β is a vector of parameters, and e_h is a mean-zero disturbance term that captures idiosyncratic factors (shocks) that contribute to different per capita income levels for households that are otherwise observationally equivalent. In addition, the variance of the disturbance term e_h is assumed to be given by:

$$\sigma^2_{e,h} = X_h \theta \qquad (c)$$

The set of covariates (listed in Table 2) included in the model above are variables on household characteristics including number of adults (ages 15 years old and above) and the ratio of young members to working age (and retired) members, characteristics of the household head such as indicator variables for female headship, marital status, educational attainment, age and age squared, occupational characteristics including dummy variables for major sector of employment, an indicator variable for ownership of land, and use of electricity. To allow for spatial heterogeneity, indicator variables pertaining to the regions were also part of the covariates.

Table 2. Variables Used and Summary Statistics.

Variable	Description	Mean	Std. Dev.	Minimum	Maximum
hh_adult	Number of adults in household	3.17	1.56	0.0	15.0
hoh_age	Age of household (hh) head in years	47.04	14.17	15.0	99.0
hoh_age_sqd	Square of the age of head	2413.82	1452.19	225.0	9801.0
hoh_hgc_97_1	Indicator on whether or not household head has no grade completed (yes = 1, no = 0)	0.04	0.20	0.0	1.0
hoh_hgc_97_2	Indicator on whether or not household head has completed elementary education (yes = 1, no = 0)	0.47	0.50	0.0	1.0
hoh_hgc_97_3	Indicator on whether or not household head has completed secondary education (yes = 1, no = 0)	0.30	0.46	0.0	1.0
hoh_married	Marital status of hh head (married = 1 or not = 0)	0.83	0.38	0.0	1.0
hoh_male	Indicator on whether hh head is male (male =1 ; female = 0)	0.85	0.36	0.0	1.0
dr	Ratio of number of persons aged 0-14 years old to number of persons 15 years old and over (in the household)*	0.88	6.66	0.0	600.0
hoh_kb1	Indicator on whether or not head works	0.39	0.49	0.0	1.0

Variable	Description	Mean	Std. Dev.	Minimum	Maximum
	in Agriculture (yes = 1, no = 0)				
hoh_kb2	Indicator on whether or not head works in Industry (yes = 1, no = 0)	0.32	0.47	0.0	1.0
own_hl	Own or owner-like possession of hose and lot (yes =1, no = 0)	0.65	0.48	0.0	1.0
electricity	Household access to electricity (yes = 1, no = 0)	0.70	0.46	0.0	1.0
agri	Whether or not household has income from Agriculture (yes = 1, no = 0)	0.30	0.46	0.0	1.0
selfemployed	Self-employed household head (yes = 1, no = 0)	0.47	0.50	0.0	1.0
region1	Indicator on whether or not household resides in Ilocos (yes = 1, no = 0)	0.05	0.23	0.0	1.0
region2	Indicator on whether or not household resides in Cagayan Valley (yes = 1, no = 0)	0.04	0.20	0.0	1.0
region3	Indicator on whether or not household resides in Central Luzon (yes = 1, no = 0)	0.10	1.30	0.0	1.0
region4	Indicator on whether or not household resides in Southern Tagalog (yes = 1, no = 0)	0.14	0.34	0.0	1.0
region5	Indicator on whether or not household resides in Bicol (yes = 1, no = 0)	0.07	0.25	0.0	1.0
region6	Indicator on whether or not household resides in Western Visayas (yes = 1, no = 0)	0.09	0.28	0.0	1.0
region7	Indicator on whether or not household resides in Central Visayas (yes = 1, no = 0)	0.07	0.26	0.0	1.0
region8	Indicator on whether or not household resides in Eastern Visayas (yes = 1, no = 0)	0.05	0.22	0.0	1.0
region9	Indicator on whether or not household resides in Western Mindanao (yes = 1, no = 0)	0.04	0.19	0.0	1.0
region10	Indicator on whether or not household resides in Northern Mindanao (yes = 1, no = 0)	0.04	0.19	0.0	1.0
region11	Indicator on whether or not household resides in Southern Mindanao (yes = 1, no = 0)	0.06	0.24	0.0	1.0
region12	Indicator on whether or not household resides in Central Mindanao (yes = 1, no = 0)	0.03	0.18	0.0	1.0
region14	Indicator on whether or not household resides in Cordillera Administrative Region (yes = 1, no = 0)	0.02	0.13	0.0	1.0
region15	Indicator on whether or not household resides in Autonomous Region of Moslem Mindanao (yes = 1, no = 0)	0.03	0.16	0.0	1.0
region16	Indicator on whether or not household resides in Caraga (yes = 1, no = 0)	0.03	0.17	0.0	1.0

*denominator of ratio modified as 0.01 in case number of persons 15 years old and over in the household is zero

Following Chaudhuri and Datt (2002), the parameters β and θ in equations (b) and (c) were estimated using a three-step feasible generalized least squares (FGLS) procedure suggested by Amemiya (1977):

- Firstly, equation (b) is estimated using an ordinary least squares (OLS) procedure. The estimated residuals from equation (b) are then used to estimate:

$$\hat{e}^2_{OLS,h} = X_h\theta + \eta_h \qquad (d)$$

which allows us essentially to have a measure of the idiosyncratic variance for each household;

- The predictions from equation (d) are then used to transform the equation as follows:

$$\frac{\hat{e}^2_{OLS,h}}{X_h\hat{\theta}_{LS}} = \frac{X_h\theta}{X_h\hat{\theta}_{LS}} + \frac{\eta_h}{X_h\hat{\theta}_{LS}} \qquad (e)$$

This transformed equation is estimated using OLS to obtain $\hat{\theta}_{FGLS}$. Note that $X_h\hat{\theta}_{FGLS}$ is a consistent estimate of $\sigma^2_{e,h}$, and thus the estimates of the standard deviation:

$$\hat{\sigma}_{e,h} = \sqrt{\chi_h\hat{\theta}_{FGLS}} \qquad (f)$$

can then be used to transform equation (b) as follows:

$$\frac{\ln Y_h}{\sqrt{X_h\hat{\theta}_{FGLS}}} = \left[\frac{X_h}{\sqrt{X_h\hat{\theta}_{FGLS}}}\right]\beta + \frac{e_h}{\sqrt{X_h\hat{\theta}_{FGLS}}} \qquad (g)$$

- OLS estimation of equation (g) yields an estimate of β, denoted as $\hat{\beta}_{FGLS}$, that can be obtained by dividing the reported standard error by the standard error of the regression. Using the estimates $\hat{\beta}$ and $\hat{\theta}$ obtained, we can estimate the expected log income :

$$E[\ln\hat{Y}_h \mid X_h] = X_h\hat{\beta}_{FGLS} \qquad (h)$$

and the variance of log income:

$$V[\ln\hat{Y}_h \mid X_h] = \hat{\sigma}^2_{e,h} = X_h\hat{\theta} \qquad (i)$$

for each household h. This inherently is based on the assumption that the covariates do not change from one time period to the next, By assuming that income per capita is log-normally distributed, we are then able to use these estimates to form an estimate of the probability that a household with the characteristics X_h will be poor, i.e., the probability level of the household's vulnerability. Letting Φ(.) denote the cumulative distribution function of the standard normal distribution, this estimated probability will be given by:

$$\hat{v}_h = \Pr(\ln\hat{Y}_h < \ln Z_h \mid X_h) = \Phi\left[\frac{\ln Z_h - X_h\hat{\beta}_{FGLS}}{\sqrt{X_h\hat{\theta}_{FGLS}}}\right] \qquad (j)$$

As Chaudhuri (2000) pointed out, substantive issues arise in the implementation of the procedure outlined above. The observed welfare indicator may have measurement error. In our case, since income has the tendency to be biased downward, then consequently, the vulnerability estimates will be upward biased. One could make some corrections for this by a multiplicative adjustment

to the estimated variances with the predicted mean of the welfare indicator set as the actual mean for each of the regions for which we estimate a separate set of regressions. Another but rather minor issue is that the possibility of having estimates of the variances $\sigma^2_{e,h}$, viz., $X_h\hat{\theta}_{FGLS}$, that are non-positive. In practice, we only found this for a few observations (specifically 18 out of 39520 observations), so we simply dropped these data from the analysis.

Some of the households interviewed for the 1997 FIES were also respondents to the 1998 APIS. The NSO designed the APIS in response to the need for more frequent and reliable information especially on non-income-based poverty correlates during the years when the FIES is not conducted. The APIS was first conducted in 1998 on a sample of 38,709 households, with some support from the World Bank. Subsequent rounds of the APIS have also been conducted in between FIES years, subject to the availability of funds.

The 1997FIES-1998 APIS panel data provide useful information on how living conditions of households changed from 1997 to 1998, especially in the wake of the Asian financial crisis and an experience of the El Niño weather phenomenon (Tabunda and Albert, 2002). Some of the 1997FIES -1998 APIS panel households were also subsequently interviewed in the 1999 APIS. The 1997 FIES-1998 APIS-1999 APIS panel data were used here for cross-validation of the empirical results of estimating household vulnerability to income poverty. The actual poverty status of households in 1998 and 1999 will provide clues on whether vulnerability estimates from the 1997 FIES data are sensible.

There are actually some doubts as to whether the 1997 income data from the FIES is comparable with the 1998 and 1999 income values (See Tabunda and Albert, 2002). In particular, for the income data, the 1997 FIES data has a full 1997 calendar year reference period (January to December 1997), while the 1998 (and 1999) APIS data is limited to the second and third quarters of 1998 (and 1999, respectively). Consequently, estimated annual income from the APIS (obtained by multiplying two to the semestral income) may be seriously underestimated due to the shorter reference period, and some differences in the FIES and APIS questionnaires. In consequence, income poverty rates from the APIS are likely to be much higher. Despite these technical limitations on the income data for the panel households, we consider analyzing the income data from the FIES and APIS. Familiarity with the historical trend of the official poverty estimates based on per capita income data serves as another validation tool. Unusually high or low values of vulnerability estimates that do not correlate with income poverty estimates would suggest further probing or explaining.

IV. RESULTS

After generating estimates of the probability of being poor in the future, it is then important to choose a vulnerability threshold. Following Chaudhuri (2000), we consider two natural thresholds for the vulnerability estimates: viz., the observed national poverty rate and the threshold 50%. The rationale for choosing a threshold of 50% has to do with having a household having at least an even chance of being poor in the next time period. Employing a vulnerability threshold equal to the national poverty rate, i.e., the average vulnerability to poverty, means that a household is more likely than the typical household to be poor in the next period. Using these two thresholds, we operationally define households to be vulnerable (V) if the predicted vulnerability level is greater than the national poverty rate; highly vulnerable (HV) if the vulnerability level is greater than 50%, and relatively vulnerable (RV) if the household is vulnerable but not highly vulnerable.

The overall picture of household poverty and vulnerability in the Philippines based on the 1997 FIES is shown in Table 3. Although 28% of households were poor, the rate of household vulnerability is 54%, of which 30% were highly vulnerable to poverty and the other 24% somewhat vulnerable. About seventeen out of twenty poor households are vulnerable; two out of every five non-poor households are also vulnerable. Among the highly vulnerable households, about two in five are non poor households. Vulnerability to poverty is thus more widespread than poverty. The targeting of vulnerable households is certainly more difficult, as more households have a significant likelihood for falling into poverty.

Table 3. 1997 Household Poverty and Vulnerability Incidence in the Philippines.

	All	Observed Poor?		Vulnerable		Highly vulnerable	
		No	Yes	No	Yes	No	Yes
Fraction observed poor	0.28	0.00	1.00	0.05	0.37	0.10	0.45
Vulnerability							
Vulnerability level: mean	0.36	0.28	0.56	0.13	0.55	0.22	0.69
Fraction vulnerable	0.54	0.42	0.85	0.00	1.00	0.34	1.00
Fraction relatively vulnerable	0.24	0.24	0.23	0.00	0.44	0.34	0.00
Fraction highly vulnerable	0.30	0.18	0.62	0.00	0.55	0.00	1.00

In Table 4, we observe that poverty in the Philippines is largely a rural phenomenon with four in ten rural households being poor, and three in four poor households living in rural areas. A substantially larger percentage of households are vulnerable: and vulnerability is rather large in both rural and urban areas. Nearly four in ten households living in urban areas are vulnerable; in addition, we see that one out of every three vulnerable households live in urban areas. While household poverty rate is only about five percent in Metro Manila, the proportion of vulnerable households is twice this figure. All these results suggest that while government ought to improve the plight of people's living standards in rural areas, they ought to also provide a number of social safety nets in urban areas. Regional disparities are evident, whether in terms of poverty or vulnerability, with poverty and vulnerability rates (as well as shares) across the regions being highly correlated. Such gross disparities in poverty and vulnerability between urban and rural areas, and across the regions suggest the need for government to work on not only poverty policies of regional development, but looking into the varying vulnerability profiles across the regions (see Table A-1).

Table 4. 1997 Poverty and Vulnerability Estimates by Household Residence.

Area	Population Share	Share of poor	Share of Vulnerable	Share of Highly Vulnerable	Fraction Poor	Mean Vulnerability	Fraction Vulnerable	Fraction Highly Vulnerable
Rural	*0.52*	*0.75*	*0.67*	*0.75*	*0.40*	*0.45*	*0.69*	*0.43*
Urban	*0.48*	*0.25*	*0.33*	*0.25*	*0.15*	*0.26*	*0.38*	*0.16*
LUZON	**0.56**	**0.42**	**0.47**	**0.39**	**0.21**	**0.30**	**0.45**	**0.21**
Region 1	0.05	0.06	0.05	0.05	0.31	0.34	0.54	0.25
Region 2	0.04	0.04	0.05	0.06	0.27	0.44	0.68	0.40
Region 3	0.10	0.05	0.10	0.07	0.14	0.32	0.54	0.20
Region 4	0.14	0.11	0.13	0.11	0.23	0.33	0.52	0.23
Region 5	0.07	0.11	0.08	0.09	0.47	0.44	0.67	0.41
National Capital Region	0.14	0.02	0.03	0.00	0.05	0.12	0.10	0.01
Cordillera	0.02	0.02	0.02	0.02	0.36	0.35	0.57	0.28

Administrative Region								
VISAYAS	**0.21**	**0.27**	**0.26**	**0.31**	**0.35**	**0.45**	**0.67**	**.043**
Region 6	0.09	0.11	0.13	0.17	0.37	0.53	0.78	0.56
Region 7	0.07	0.08	0.07	0.06	0.30	0.33	0.52	0.26
Region 8	0.05	0.08	0.07	0.08	0.40	0.46	0.69	0.47

Area	Population Share	Share of poor	Share of Vulnerable	Share of Highly Vulnerable	Fraction Poor	Mean Vulnerability	Fraction Vulnerable	Fraction Highly Vulnerable
MINDANAO	**0.22**	**0.30**	**0.27**	**.30**	**0.38**	**0.42**	**0.64**	**.40**
Region 9	0.04	0.04	0.05	0.05	0.32	0.42	0.66	0.41
Region 10	0.04	0.05	0.04	0.03	0.38	0.33	0.49	0.26
Region 11	0.06	0.07	0.06	0.06	0.31	0.34	0.54	0.27
Region 12	0.03	0.05	0.05	0.06	0.44	0.53	0.79	0.56
Autonomous Region of Moslem Mindanao	0.04	0.05	0.04	0.05	0.52	0.54	0.81	0.62
CARAGA	0.03	0.05	0.04	0.05	0.45	0.49	0.75	0.49

Reyes (2002) suggests that poverty profiles in the Philippines have essentially remained unchanged over the years. Such modest reduction in poverty can in part be attributed to high levels of income inequalities. High inequality in the Philippines has not only provided a smaller share of resources for those at the bottom of the income per capita distribution, but also made it difficult for the country to have substantial economic growth, which in turn, leads to modest poverty reduction. Rapid and sustained economic growth is, after all, a necessary (but not sufficient) condition for rapid poverty reduction. So, government ought to seriously look into more having more regressive taxation policies and other redistribution policies as part of its attempt to address poverty and vulnerability.

There is certainly no reason to limit ourselves to an analysis of future poverty measures derived from poverty incidence measures. Estimates of future poverty gaps and future poverty squared gaps can be generated via simulation that account for income volatilities. Results shown in Table 5 suggest that the depth and severity of poverty may even be much greater in future time periods than the current levels that were measured (whether for urban or rural households, or across the country). With such results, we see why ex-ante poverty prevention interventions ought to be considered and implemented, aside from ex post poverty alleviation efforts.

Table 5. Poverty Gap and Poverty Squared Gap (Actual and Estimated Future Statistics) by Area.

Area	Poverty Gap Measure		Poverty Squared Gap Measure	
	1997 Actual	Estimated Future	1997 Actual	Estimated Future
Urban	0.040	0.097	0.016	0.063
Rural	0.123	0.217	0.052	0.148
Philippines	0.084	0.160	0.035	0.108

In Table 6, we observe that households where the head has little or no schooling are poorer and more vulnerable than those with more education. A significant percentage of the poor households are systematically being trapped in a prison of vulnerability. This is, of course, to be expected as less-educated household heads usually have minimal paying occupations, which increases the household's likelihood to be poor. Government ought to thus focus its long term strategies around educational programs both for poverty reduction and vulnerability mitigation purposes. Increasing access to education, both formal and non formal, especially quality education would likely provide a means for people to get better paying job that will not put them at risk of being poor. Improving access to education, especially to tertiary education, appears to be a good strategy for mitigating a household's risk of being poor in the future. While there may seemingly be some gains in improving universal access to education over the past several decades, there are questions on whether low income families are being given improved access to quality education, especially in higher education (Albert, 2000). Larger-sized households are not just poorer (than those with small sizes) but also more vulnerable. In fact, non-vulnerable, vulnerable and highly vulnerable households have an average family size of 4.6, 5.3, and 5.9, respectively. Consequently, government will have to adopt vigorous and aggressive population management policies that discourage families from having family sizes that are not within their means. Large-sized families have the tendency to have difficulties in maximizing their human resource potentials given their limited financial capacities; they are typically unable to provide quality education for the young and this further puts these families at risk of being poor. Reyes (2002) points out that "while the proportion of poor families has declined between 1985 and 2000, the actual number of poor families has gone up from 4.36 million in 1985 to 5.14 million in 2000 due to the increase in the population." There has been little attention given to population management in the Philippines despite the overwhelming evidence that supports the nexus between population and poverty (and now, vulnerability). A number of countries, especially in the East Asia and Pacific region, have made substantial gains in reducing poverty through rapid economic growth coupled with population management. With modest economic growth in the Philippines and an absence of population policies by government, it is not surprising why gains in poverty reduction have been lackluster. Male headed households appear to be poorer and more vulnerable than their female headed counterparts. Some researchers may find such a result surprising, but this may be explained by a number of factors, including the lack of an adequate operational definition of household headship. In fact, as Chant (2003) points out, there are mixed results on the relationship between household headship and poverty status across countries, and this issue ought be the subject of further research given the clear relationship between poverty and gender issues. As far as employment is concerned, while poverty rates for households with unemployed heads are rather low, vulnerability rates for such households are much higher. This suggests the need for some formal mechanisms such as publicly provided insurance for households with heads who are unemployed. Kakwani (2000) suggests that the unemployed in the Philippines may be unemployed by choice, especially with family members working overseas. However, there appears to be a need to help such households mitigate the impact of falling into future poverty. Also heads of poor and vulnerable (as well as highly vulnerable) households are predominantly in the agriculture sector suggesting that many program and policy interventions must be directed toward helping this sector. Declines in income are likely to be devastating for households with heads in the agriculture sector as many of them are likely to have few assets or to have access to insurance or credit that will allow them to hedge against income shocks occurring from bad harvests or bad weather (Tabunda and Albert, 2002). Although the Philippines has supposedly tried out a number of agricultural programs on agrarian reform and on modernizing agriculture, these results coupled with continuing huge gaps between farm gate and retail prices of agricultural products suggest that such policies and programs may have, at best, had minimal impact on helping farmers reap the fruits of their labors. It may be interesting to determine how long on average it will take poor households with heads employed in agriculture to exit poverty

(see Albert and Collado, 2002) and to simulate the effects of ex-ante policy interventions that can help prevent the many risks these vulnerable households face or mitigate the impact of such risks (by reducing the exposure to these risks).

Table 6. 1997 Poverty and Vulnerability Estimates By Various Household Head and Household Characteristics.

	Population share	Share of Poor	Share of Vulnerable	Share of Highly Vulnerable	Fraction Poor	Mean Vulnerability	Fraction Vulnerable	Fraction Highly Vulnerable
Highest Educational Attainment of Household Head								
At most Elementary	0.51	0.73	0.69	0.79	0.40	0.47	0.74	0.46
Beyond Elementary, but at most Secondary	0.30	0.23	0.27	0.20	0.22	0.31	0.49	0.20
Tertiary or Better	0.20	0.04	0.04	0.01	0.06	0.12	0.10	0.02
Household Size								
Small (At most Four)	0.40	0.23	0.32	0.29	0.16	0.30	0.44	0.22
Moderate (> 4 but at most 6)	0.35	0.37	0.35	0.35	0.30	0.36	0.55	0.30
Large (>6)	0.25	0.40	0.33	0.36	0.45	0.45	0.69	0.43
Sex of Head								
Male	0.85	0.91	0.88	0.91	0.30	0.37	0.56	0.32
Female	0.15	0.09	0.12	0.09	0.17	0.29	0.42	0.19
Sector of Employment of Head								
Agriculture	0.40	0.67	0.57	0.69	0.48	0.51	0.77	0.53
Industry	0.32	0.20	0.26	0.19	0.18	0.28	0.44	0.18
Services	0.14	0.05	0.08	0.05	0.10	0.22	0.30	0.11
NONE (Unemployed)	0.14	0.08	0.10	0.06	0.15	0.25	0.37	0.13

To validate the vulnerability profile presented above (and the regional profile in Table A-1 found in the Appendix), we investigated how well the vulnerability estimates are able to predict the household poverty status in 1998 and in 1999 for the 15,480 households in the 1997FIES-1998 APIS-1999 APIS panel. Thresholds used for classifying households as poor or non poor in 1998 and in 1999 are given in Table A-2 (found in the Appendix). These poverty thresholds are the 1997 official poverty thresholds inflated by the corresponding regional consumer price index, but further raked to take into account of the 2000 official poverty thresholds.

Since Philippine households are known to have suffered from the effects of the financial crisis in 1997 and El Nino (see Tabunda and Albert, 2001), an investigation of the actual poverty status of the households in 1998 and 1999 based on the poverty thresholds in Table A-2 would help validate the vulnerability estimates derived here. As shown in Table 7, among the panel households that were poor in each year, nearly seven out of ten households classified as highly vulnerable in 1997 became poor in either 1998 or 1999; slightly over seven out of ten non-vulnerable households were neither poor in 1998 nor in 1999. About three in five vulnerable households became poor in either 1998 or 1999, or both. About seventy percent of households that were poor in at least one of the two years were classified as vulnerable, and about three in five households that were neither poor in 1998 nor in 1999 were classified as non-vulnerable. These results provide some validation of the vulnerability measurement methodology employed here.

Table 7. Frequency (and Unweighted Percentage) of Households by Poverty Status in 1998 and 1999 across 1997 Vulnerability Classification.

Poverty Status	1997 Vulnerability Classification			Total
	Highly Vulnerable	***Relatively Vulnerable***	***Not Vulnerable***	
Poor Only in 1998	532 (11.62)	422 (10.96)	539 (7.64)	1,493 (9.64)
Poor Only in 1999	565 (12.34)	421 (10.94)	550 (7.8)	1,536 (9.92)
Poor in both of 1998 and 1999	2,023 (44.2)	954 (24.79)	864 (12.25)	3,841 (24.81)
Non-poor in both 19998 & 1999	1,457 (31.83)	2,052 (53.31)	5,101 (72.31)	8,610 (55.62)
Total	4,577 (100)	3,849 (100)	7,054 (100)	15,480 (100)

V. CONCLUSIONS AND RECOMMENDATIONS

The measurement of vulnerability in the Philippines using income data from the 1997 FIES and the methodology of Chaudhuri (2000) was attempted in this study. About 54% of the household population are found to be vulnerable (as compared to the official estimate of household poverty incidence at 28%). Since more than half of the vulnerable households are not currently poor, it is not clearly enough to use current income poverty status as a proxy for vulnerability. Poverty reduction strategies need to incorporate not just alleviation efforts but also prevention. Regions with highest poverty incidences appear to be also those with highest estimates of vulnerability, but vulnerability rates are usually much higher than poverty rates. Vulnerability patterns vary across regions suggesting that interventions would also have to vary. While rural vulnerability is higher than urban poverty, the gap in estimates of vulnerability is much lower than those pertaining to poverty. This suggests that government should not merely focus on rural poverty reduction, but also on policies and programs that protect vulnerable households in urban areas. Vulnerability rates of households with unemployed heads are much higher than their corresponding poverty rates. Government ought to consider developing social protection mechanisms beyond job generation, such as publicly provided insurance for unemployed heads and improved access to credit. Vulnerable households have, on average, much larger family sizes than their non-vulnerable counterparts, suggesting that government ought to seriously pay attention to population management to enable households to minimize their risks of becoming poor. Households whose heads have more schooling are less likely to be poor. Thus government should vigorously increase access to education, especially higher education.

While the vulnerability model used here is limited by the available information from the FIES regarding household characteristics that make these households vulnerable (and there are certainly a lot more factors that contribute to vulnerability), the validation exercise on panel households indicates that the vulnerability estimation methodology employed here has a strong predictive power in identifying households that are likely to be poor in the future (at least for the available panel data). In particular, a considerable proportion of the panel households that were poor in 1998 or 1999, or both, were actually tagged as vulnerable households with the model employed.

The research undertaken here suggests the usefulness of coming up with a profile of vulnerability in the Philippines. Given that APIS has more non income indicators than the FIES, such as membership in cooperatives, whether the household was a beneficiary of the Comprehensive

Agrarian Reform Program (CARP), among others, it may just as well be important to develop vulnerable estimates from the APIS. With the obvious importance of vulnerability measurement for policy concerns, it is recommended that the Philippine Statistical System adopt ways to institutionalize vulnerability measurement and measure trends in vulnerability, aside from addressing current limitations in the official poverty measurement system. Just as it is not just enough to cure the sick, but also important to help ways of preventing sickness, similarly, it is not enough to merely have policies on poverty alleviation but to have measures in place that will address household vulnerability to poverty. The conditions that vulnerable households face may permanently damage their long term welfare, or lead these vulnerable households to further risk-induced poverty traps that may offer some stability but low returns, which then entrap them into a state of permanent poverty. Government will thus have to manage social risks by designing and implementing interventions that can strengthen informal, market based or public arrangements that contribute to reducing the risk of households becoming income poor, or help to mitigate the impact of their becoming poor and assist them in coping with poverty's dire consequences.

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APPENDIX

Table A-1. Vulnerability Profile of Households, by Region

Region I: Ilocos

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	31.46	35.53	66.99
Beyond Elementary, but at most Secondary	35.58	21.74	57.32
Tertiary or Better	8.54	1.28	9.82
Household Size			
Small (At most Four)	21.71	15.15	36.86
Moderate (> 4 but at most 6)	29.84	27.22	57.06
Large (>6)	38.56	36.89	75.45
Sector of Employment of Head			
Agriculture	31.64	38.61	70.25
Industry	32	18.18	50.18
Services	21.76	9.89	31.65
NONE (Unemployed)	21.66	10.75	32.41

Region II: Cagayan Valley

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	29.89	52.04	81.93
Beyond Elementary, but at most Secondary	31.12	32.49	63.61
Tertiary or Better	10.13	2.68	12.81
Household Size			
Small (At most Four)	26.31	30.36	56.67
Moderate (> 4 but at most 6)	32.58	42.67	75.25
Large (>6)	21.29	59.92	81.21
Sector of Employment of Head			
Agriculture	25.92	50.45	76.37
Industry	33.67	30.8	64.47
Services	23.27	13.18	36.45
NONE (Unemployed)	29.95	19.18	49.13

Region III: Central Luzon

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	38.07	30.03	68.1
Beyond Elementary, but at most Secondary	40.17	13.86	54.03
Tertiary or Better	10.36	0.18	10.54
Household Size			
Small (At most Four)	27.17	12.53	39.7
Moderate (> 4 but at most 6)	37.44	18.72	56.16
Large (>6)	40.75	32.45	73.2
Sector of Employment of Head			
Agriculture	33.48	31.32	64.8
Industry	36.8	17.47	54.27
Services	29.23	12.11	41.34
NONE (Unemployed)	33.46	11.88	45.34

Region IV: Southern Luzon

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	31.87	36.58	68.45
Beyond Elementary, but at most Secondary	36.09	15.29	51.38
Tertiary or Better	7.44	0.7	8.14
Household Size			
Small (At most Four)	23.83	14.96	38.79
Moderate (> 4 but at most 6)	30.21	24.16	54.37
Large (>6)	34.53	36.94	71.47
Sector of Employment of Head			
Agriculture	29.91	41.95	71.86
Industry	29.16	18.2	47.36
Services	24.64	9.5	34.14
NONE (Unemployed)	27.61	10.52	38.13

Region V: Bicol

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	24.95	52.93	77.88
Beyond Elementary, but at most Secondary	34.47	33	67.47
Tertiary or Better	14.2	2.34	16.54
Household Size			
Small (At most Four)	26.31	28.86	55.17
Moderate (> 4 but at most 6)	25.02	44.28	69.3
Large (>6)	26.49	52.95	79.44
Sector of Employment of Head			
Agriculture	23.62	54.92	78.54
Industry	28.18	31.79	59.97
Services	26.06	20.83	46.89
NONE (Unemployed)	31.77	22.04	53.81

Region VI: Western Visayas

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	18.15	72.65	90.8
Beyond Elementary, but at most Secondary	29.72	51.15	80.87
Tertiary or Better	20.37	6.45	26.82
Household Size			
Small (At most Four)	23.59	46.12	69.71
Moderate (> 4 but at most 6)	21.2	58.93	80.13
Large (>6)	17.6	70.51	88.11
Sector of Employment of Head			
Agriculture	14.65	77.17	91.82
Industry	28.01	40.16	68.17
Services	22.18	26.41	48.59
NONE (Unemployed)	32.9	33.88	66.78

Region VII: Central Visayas

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	28.61	37.02	65.63
Beyond Elementary, but at most	31.91	11.94	43.85

Secondary			
Tertiary or Better	6.14	0.27	6.41
Household Size			
Small (At most Four)	23.44	15.46	38.9
Moderate (> 4 but at most 6)	26.12	26.22	52.34
Large (>6)	29.98	42.46	72.44
Sector of Employment of Head			
Agriculture	24.79	42.38	67.17
Industry	28.44	18.72	47.16
Services	27	10.52	37.52
NONE (Unemployed)	22.81	8.75	31.56

Region VIII: Eastern Visayas

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	23.73	58.33	82.06
Beyond Elementary, but at most Secondary	23.68	34.38	58.06
Tertiary or Better	11.78	2.36	14.14
Household Size			
Small (At most Four)	24.41	36.13	60.54
Moderate (> 4 but at most 6)	21.51	47.79	69.3
Large (>6)	19.06	63.63	82.69
Sector of Employment of Head			
Agriculture	20.83	60.34	81.17
Industry	25.78	32.52	58.3
Services	18.18	21.36	39.54
NONE (Unemployed)	26.35	22.88	49.23

Region IX: Western Mindanao

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	28.28	54.88	83.16
Beyond Elementary, but at most Secondary	28.01	31.94	59.95
Tertiary or Better	8.78	0.52	9.3
Household Size			
Small (At most Four)	27.78	32.45	60.23
Moderate (> 4 but at most 6)	25.16	39.83	64.99
Large (>6)	21.23	55.34	76.57
Sector of Employment of Head			
Agriculture	23.95	59.31	83.26
Industry	30.31	22.5	52.81
Services	17.37	8.64	26.01
NONE (Unemployed)	30.57	14.42	44.99

Region X: Northern Mindanao

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	27.28	41.72	69
Beyond Elementary, but at most Secondary	26.74	15.25	41.99
Tertiary or Better	5.24	1.28	6.52
Household Size			
Small (At most Four)	20.73	16.05	36.78
Moderate (> 4 but at most 6)	22.11	25.99	48.1
Large (>6)	25.66	39.32	64.98
Sector of Employment of Head			

Agriculture	26.33	41.3	67.63
Industry	20.84	15.34	36.18
Services	13.77	7.09	20.86
NONE (Unemployed)	22.88	11.52	34.4

Region XI: Southern Mindanao

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	28.78	42.14	70.92
Beyond Elementary, but at most Secondary	31.57	16.71	48.28
Tertiary or Better	8.93	0.38	9.31
Household Size			
Small (At most Four)	26.25	18.92	45.17
Moderate (> 4 but at most 6)	23.03	28.24	51.27
Large (>6)	30.4	39.44	69.84
Sector of Employment of Head			
Agriculture	27.96	44.21	72.17
Industry	27.04	13.95	40.99
Services	21.07	6.45	27.52
NONE (Unemployed)	20.16	7.01	27.17

Region XII: Central Mindanao

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	19.02	72.47	91.49
Beyond Elementary, but at most Secondary	29.58	56.17	85.75
Tertiary or Better	27.71	7.79	35.5
Household Size			
Small (At most Four)	22.97	45.5	68.47
Moderate (> 4 but at most 6)	26.13	55.72	81.85
Large (>6)	21.47	69.98	91.45
Sector of Employment of Head			
Agriculture	20.32	71.03	91.35
Industry	29.68	39.11	68.79
Services	23.2	32.86	56.06
NONE (Unemployed)	29.21	33.73	62.94

National Capital Region

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	22.91	3.3	26.21
Beyond Elementary, but at most Secondary	11.13	0.41	11.54
Tertiary or Better	0.75	0.1	0.85
Household Size			
Small (At most Four)	5.43	0.22	5.65
Moderate (> 4 but at most 6)	8.74	0.86	9.6
Large (>6)	17.8	1.98	19.78
Sector of Employment of Head			
Agriculture	25.16	2.5	27.66
Industry	10.68	0.95	11.63
Services	7.84	0.57	8.41
NONE (Unemployed)	8.1	0.96	9.06

Cordillera Administrative Region

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	32.28	45.29	77.57
Beyond Elementary, but at most Secondary	35.47	19.93	55.4
Tertiary or Better	12.02	0.77	12.79
Household Size			
Small (At most Four)	30.8	16.87	47.67
Moderate (> 4 but at most 6)	27.09	27.62	54.71
Large (>6)	27.87	45.53	73.4
Sector of Employment of Head			
Agriculture	29.68	44.27	73.95
Industry	33.53	14.07	47.6
Services	16.7	9.35	26.05
NONE (Unemployed)	31.56	7.3	38.86

Autonomous Region of Muslim Mindanao

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	15.33	78.46	93.79
Beyond Elementary, but at most Secondary	26.25	46.37	72.62
Tertiary or Better	21.43	8.4	29.83
Household Size			
Small (At most Four)	24.05	48.95	73
Moderate (> 4 but at most 6)	17.9	65.71	83.61
Large (>6)	14.75	68.2	82.95
Sector of Employment of Head			
Agriculture	15.48	76.71	92.19
Industry	26.46	24.05	50.51
Services	22.2	14.92	37.12
NONE (Unemployed)	39.17	41.82	80.99

Caraga

	Proportion Relatively Vulnerable	Proportion Highly Vulnerable	Proportion Vulnerable
Highest Educational Attainment of Household Head			
At most Elementary	21.58	65.45	87.03
Beyond Elementary, but at most Secondary	35.52	44.28	79.8
Tertiary or Better	23.78	4.24	28.02
Household Size			
Small (At most Four)	27.82	38.07	65.89
Moderate (> 4 but at most 6)	25.21	49.81	75.02
Large (>6)	22.62	66.44	89.06
Sector of Employment of Head			
Agriculture	23.54	62.03	85.57
Industry	24.82	40.03	64.85
Services	25.67	25.86	51.53
NONE (Unemployed)	39.32	31.02	70.34

Table A-2. Poverty Thresholds in 1998 and 1999

Province	1998		1999	
	Urban	**Rural**	**Urban**	**Rural**
NCR 1st District	14,717	-	15,507	-
NCR 2nd District	14,280	-	15,047	-
NCR 3rd District	13,610	-	14,341	-
NCR 4th District	14,859	-	15,656	-
Ilocos Norte	10,980	10,855	11,865	11,730
Ilocos Sur	10,928	11,925	11,809	12,887
La Union	11,425	12,575	12,346	13,589
Pangasinan	11,398	10,880	12,316	11,757
Batanes	13,126	9,850	14,338	10,759
Cagayan	10,360	8,740	11,317	9,548
Isabela	12,613	11,482	13,778	12,543
Nueva Vizcaya	11,635	10,039	12,710	10,966
Quirino	10,342	8,438	11,298	9,217
Bataan	11,923	12,711	12,696	13,536
Bulacan	12,718	12,957	13,542	13,797
Nueva Ecija	14,962	12,527	15,932	13,340
Pampanga	13,708	11,885	14,597	12,656
Tarlac	12,464	11,333	13,273	12,068
Zambales	12,612	10,356	13,430	11,028
Batangas	13,661	14,056	14,729	15,155
Cavite	12,629	14,443	13,616	15,573
Laguna	12,119	12,154	13,066	13,104
Marinduque	10,899	10,191	11,750	10,988
Occidental Mindoro	10,406	9,341	11,220	10,071
Oriental Mindoro	13,320	11,790	14,361	12,711
Palawan	11,536	10,991	12,438	11,850
Quezon	11,996	12,145	12,934	13,095
Rizal	13,232	13,943	14,266	15,032
Romblon	11,174	10,231	12,047	11,030
Aurora	10,516	10,944	11,338	11,799
Albay	13,143	9,148	14,159	9,855
Camarines Norte	12,103	9,461	13,039	10,192
Camarines Sur	11,878	9,592	12,797	10,333
Catanduanes	12,163	9,210	13,104	9,922
Masbate	11,604	10,481	12,501	11,291
Sorsogon	11,307	10,003	12,181	10,775
Aklan	10,536	9,443	11,302	10,129
Antique	10,219	9,609	10,962	10,308
Capiz	11,257	11,471	12,076	12,304
Iloilo	11,167	11,127	11,979	11,936
Negros Occidental	9,978	9,845	10,703	10,561
Guimaras	10,457	9,712	11,217	10,419
Bohol	8,751	6,864	9,437	7,403
Cebu	9,890	8,239	10,666	8,886
Negros Oriental	9,760	8,324	10,525	8,977
Siquijor	9,631	7,343	10,386	7,919
Eastern Samar	9,156	8,825	9,899	9,542
Leyte	9,096	8,353	9,834	9,031
Northern Samar	7,848	7,131	8,485	7,710
Western Samar	9,035	7,824	9,768	8,459
Southern Leyte	9,235	8,557	9,984	9,251
Biliran	8,799	8,733	9,513	9,442
Basilan	9,952	8,191	10,637	8,755
Zamboanga Norte	10,551	8,126	11,277	8,685
Zamboanga Sur	9,858	7,631	10,537	8,156

Bukidnon	8,872	7,929	9,402	8,402
Camiguin	11,424	10,100	12,106	10,704
Misamis Occidental	9,535	8,325	10,105	8,823
Misamis Oriental	10,182	8,752	10,790	9,275
Davao del Norte	9,916	8,048	10,309	8,368
Davao del Sur	10,948	8,184	11,383	8,509
Davao Oriental	11,027	9,851	11,465	10,243
South Cotabato	11,016	9,090	11,454	9,451
Saranggani	10,430	9,325	10,844	9,695
Lanao del Norte	11,065	10,232	11,646	10,770
North Cotabato	10,199	9,086	10,735	9,564
Sultan Kudarat	11,364	10,187	11,961	10,722
Abra	11,552	13,354	12,506	14,458
Benguet	13,400	13,365	14,507	14,469
Ifugao	10,553	9,238	11,425	10,001
Kalinga	10,485	9,310	11,352	10,079
Mt. Province	15,149	15,254	16,401	16,515
Apayao	9,696	9,546	10,497	10,335
Lanao del Sur	10,919	11,400	11,815	12,336
Maguindanao	11,761	10,928	12,727	11,825
Sulu	10,816	10,149	11,704	10,982
Tawi-tawi	10,633	8,969	11,506	9,705
Agusan del Norte	10,467	8,429	11,326	9,121
Agusan del Sur	10,496	8,270	11,356	8,948
Surigao Del Norte	10,706	8,955	11,584	9,690
Surigao Del Sur	10,158	8,446	10,991	9,138