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ANATOMY OF RURAL HOUSEHOLD WELFARE  
The Philippines

by

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Abstract

The paper provides a consistent set of estimates of poverty incidence in the Philippines, investigates the determinants of rural household welfare, and explores empirically an important aspect of the so-called poverty targeting problem. Regression techniques are employed to explain (i) regional differences in rural poverty incidence and (ii) the variation in rural household welfare. The regression results are used to reinterpret (or question) a number of commonplace claims concerning the character of rural poverty in the Philippines.

Poverty targeting is fraught with informational problem: The poor are not easily identifiable and the cost of targeting may be quite high. In addressing this issue, the paper applies a simple computational procedure to national survey data of family incomes and expenditures. The question asked is: Given a fixed amount of money available for transfers, which particular target group in the Philippines should be the focus of attention for a maximum reduction in rural poverty? The results of the exercise offer useful insights for poverty alleviation policies.

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# ANATOMY OF RURAL HOUSEHOLD WELFARE

## The Philippines

### 1. Introduction

Although there are still unresolved issues in poverty measurement, the evidence is compelling that the large majority of the poor in developing countries are found in rural areas. Why the rural poor are poor is, however, less understood, partly because of the diversity of their economic and social circumstances, including the political environment in which they live, and, until the second-half of the 1980s, partly because of the neglect of poverty research in the development literature. There is, for example, scanty research on the impact of economywide policies on the rural poor in less developed countries, including the Philippines. Limited attention is likewise given to the design of public policies aimed at securing the economic welfare of the chronically poor members of the society. As is well known, targeting public programs to the poor groups is fraught with informational problems: the poor are not easily identifiable and the costs of targeting may be quite high. The challenge is to design policy interventions in such a manner that the intended beneficiaries are reached and that the costs are less compared to alternative (untargeted) programs.

In the Philippines, as shown in the next section of this paper, rural poverty contributes nearly two-thirds of the national poverty. While some progress has been made in the

recent past, the magnitude and severity of rural poverty remain high. The second section of this paper provides a consistent set of estimates of poverty incidence in the Philippines. The third and fourth sections then employ regression techniques to explain (i) *regional* differences in rural poverty incidence in the Philippines and (ii) the variation in rural *household* welfare. The fifth section applies a simple computational procedure to national survey data of family incomes and expenditures to address the issue of poverty targeting. The question asked is: Given a fixed amount of money available for transfers, which particular target group in the Philippines should be the focus of attention for a maximum reduction in rural poverty? Finally, the sixth section provides concluding comments.

## 2. Measuring Rural Poverty

The statistical base for the analysis in this section is mainly the various rounds of the nationwide Family Income and Expenditure Survey (FIES). These surveys were undertaken in 1961, 1965, 1971, 1975, 1979, 1985, and 1988. The 1975 and 1979 surveys, however, were not published due to some technical problems, one of which was the implausibility of the data generated arising from substantial undercoverage. Excluding 1975 and 1979, it appears that the FIES provides a reasonably good series -- and the *only* one available -- for the analysis of trends in income inequality and poverty over the last three decades. Unfortunately, we have been limited to published

tabulations for 1961, 1965, and 1971, and have acquired data tapes only for 1985 and 1988.<sup>1</sup>

The identification of the poor and the attendant aggregation which brings together the data on the poor into an overall measure of poverty, almost always involve a construction, albeit imprecise, of a poverty line or threshold.<sup>2</sup> For practical purposes, we define a poverty threshold as the critical minimum amount of income below which a household (or person) cannot attain a predetermined consumption bundle of goods and services, as judged necessary for the fulfillment of certain basic consumption needs, most importantly (in the context of this study) adequate nutrition. We have adopted the NEDA-FNRI-NSO technical working group's estimates of poverty lines for 1985 for the country's 13 regions subdivided into rural and urban areas. We have adjusted these estimates for inflation to obtain poverty thresholds (at current prices) for 1961, 1965, 1971, and 1988. Although necessarily still imprecise, these estimates take into account regional price differences and consumption patterns (and thus avoid a major shortcoming of previous studies) as well as the desirability of imposing consistent definitions of poverty thresholds throughout the period of analysis.<sup>3</sup>

Given the above restrictive definition of poverty as a single index of disadvantage over economic resources, a natural choice of indicator of living standards is total consumption, or expenditure plus home produced goods and services. A household is then considered to be poor if its consumption falls below the

poverty line. One advantage of using total consumption rather than total income is that the former takes into account the household's borrowing (or lending) possibilities. These tend to smooth out temporary variations in current income, thereby allowing the attainment of a certain level of living. Another advantage of using consumption is that income may overstate the level of living when money alone is not sufficient to guarantee access to goods and services. This is, for example, the case when goods are rationed or are not available.

Unfortunately, the available data allow us to estimate comparable poverty incidence based on household consumption only for 1985 and 1988. In an earlier paper (Balisacan, 1991), we had argued that the FIES income data provide a reasonably meaningful basis for the assessment of trends (rather than precise magnitudes) of poverty incidence. Thus, in the analysis below, we use income to establish trends in overall poverty incidence since 1961. However, for the analysis of the determinants of rural household welfare, we exploit the information on consumption available in the 1985 and 1988 FIES.

Most researchers agree that a list of desirable properties of a summary measure of poverty would have to include what has become known as the *monotonicity* and *transfer* axioms (due to Sen, 1976). The first axiom states that poverty should increase whenever, given other things, the income of a poor person falls. The transfer axiom, on the other hand, simply says that poverty

should increase whenever a transfer of income from a poor person to a richer one takes place.

A class of poverty measures which we employ here is that proposed by Foster, Greer, and Thorbecke (1984, hereafter FGT). This is given by:

$$P_{\alpha} = \frac{1}{n} \sum_{i=1}^q \left( \frac{z - y_i}{z} \right)^{\alpha} \quad (1)$$

where  $z$  is the predetermined per capita poverty line,  $y_i$  is the per capita consumption of the  $i$ th family,  $q$  is the number of poor families (having no consumption greater than or equal to  $z$ ),  $n$  is the total number of families, and  $\alpha \geq 0$  is a measure of poverty aversion. The parameter  $\alpha$  indicates the importance given to the poorest poor: the larger  $\alpha$  is, the greater is the emphasis given to the poorest families. As the value of  $\alpha$  becomes very large,  $P_{\alpha}$  approaches a "Rawlsian" measure giving weight only to the poorest among the poor.

The most commonly used poverty measure, the headcount (H) index, is a special case of the FGT class of measures. That is, for  $\alpha=0$ , (1) simply becomes the proportion of the population with a standard of living below the poverty line. This index fails both the monotonicity and transfer axioms. Another familiar poverty measure, the average poverty gap, is also subsumed in the FGT class of measures. This index (for  $\alpha=1$ ) is the average, over all families, of the gaps between poor families' standard of living and the poverty line, as a ratio of the poverty line. The

index is sensitive to the *depth* of poverty, thereby satisfying the monotonicity axiom, but, because the poverty deficits are weighted equally, it is not sensitive to the *distribution* of standard of living among the poor. It thus fails the transfer axiom. Where the weights are the income gaps themselves, the resulting  $P_\alpha$  measure is distributionally sensitive. For example, for  $\alpha=2$ , the resulting measure,  $P_2$ , in (1) is then simply the mean of the squared poverty deficits. This measure satisfies both axioms for a desirable summary measure of poverty.<sup>4</sup>

The FGT class of poverty measures is additively decomposable in the following sense: The aggregate (population) poverty level is simply a weighted average of the subgroup poverty levels, the weights being their population shares. That is,

$$P_\alpha = \sum_{j=1}^m \gamma_j P_{\alpha,j}(Y_j) \quad (2)$$

where  $\gamma_j$  is the proportion of population to be found in group  $j$ , and  $m$  is the number of mutually exclusive and exhaustive groups. This property proves to be extremely useful for our purposes. For example, for a policy change that increases the incomes of group  $i$  and reduces those of group  $j$ , we can work out the impact of the change on each group's average poverty level, and then use the groups' respective population shares to estimate the new aggregate poverty level.

Table 1 shows the trends in poverty incidence for the selected years. All the poverty indices exhibited a decline.



Based on income data, headcount poverty fell from 75 percent in 1961 to 62 percent in 1971, to 58 percent in 1985, and to 49 percent in 1988. The average poverty gap over the whole population was about 40 percent in 1961, 30 percent in 1971, and 17 percent in 1988. Note that although income inequality hardly changed between 1961 and 1971 (see Baalisacan, 1991), the headcount declined by an annual average of 1.3 percentage points.<sup>5</sup> This shows that the benefits of relatively modest growth of GDP per capita -- averaging about 2 percent per year -- during this period "trickled" down to the poor, although only minimally compared to the experience of other Asian countries. Moreover, the oft-repeated argument that the post-World War II economic growth in the Philippines completely bypassed the poor (see, e.g., International Labor Organization, 1974; Mangahas and Barros, 1980; and Oshima, 1990) is not supported by the figures in Table 1.<sup>6</sup> Note too, however, that the relatively fast growth of the population -- averaging 2.9 percent per year between 1961 and 1971 and 2.6 percent per year between 1971 and 1985 -- meant a 57 percent increase in the total number of poor families from 3.3 million in 1961 to 5.2 million in 1988.<sup>7</sup>

The levels of poverty incidence estimated from consumption data are higher than those from income data. Moreover, although the direction of change is consistent in both sets of estimates, the proportional decline of poverty incidence tends to be faster for estimates based on income than those based on consumption. The FGT ( $\alpha=2$ ) measure, for example, showed a decline of 33

percent between 1985 and 1988 when one uses income, but only 17 percent when one uses consumption.

The incidence of poverty was higher in rural areas than in urban areas, although the difference tended to narrow down since 1961. This tendency paralleled the increase in the ratio of average rural family income to average urban family income.<sup>8</sup> Based on the headcount index, rural poverty accounted for the bulk of overall poverty (nearly three-fourths in 1965 and 1971 and about two-thirds in 1985 and 1988), mainly because of the greater number of families residing in rural areas. This contribution appeared to be even larger if poverty gaps were used as weights (i.e., consideration is given to poverty aversion), simply because poverty gaps were larger in rural areas than in urban areas.

Earlier (see Balisacan, 1991), we had shown that income inequality in rural areas noticeably increased between 1961 and 1971. This arose partly from the fact that the adoption of modern technologies in the 1960s and early 1970s tended to be initially concentrated among large farmers, with small farmers catching up in later years (Herdt, 1987). The distribution of agricultural landholdings was also highly skewed. Finally, the growth of productive employment opportunities in off-farm areas was slow in relation to the growth of the labor force. Table 1 shows that despite the increase in income inequality, all the indices of rural poverty showed a decline during this period, further supporting the argument that rural (mainly agricultural)

growth itself, even if it initially increases income inequality, is a powerful stimulus to poverty reduction.

There are substantial differences in the incidence of poverty among the various regions of the country (Table 2). Based on the 1988 FIES, Metro Manila and Central Luzon, which both accounted for 23 percent of the population, had the lowest poverty incidence. Their combined share in overall poverty was approximately 20 percent. Note that while Metro Manila had the highest GDP per capita among the regions of the country, Central Luzon's GDP per capita was slightly lower than the average for all regions. Regions with the highest headcount poverty were Bicol Region (72 percent), Eastern Visayas (68 percent), Western Visayas (67 percent), Central Visayas (67 percent), and Cagayan Valley (63 percent). Bicol and Eastern Visayas had the lowest GDP per capita among the regions. Western Visayas' GDP per capita in the late 1980s was about 20 percent lower than the national average. This region also had higher land concentration and higher incidence of landlessness than the national average.

The vast majority (60 percent) of the rural poor are engaged in farming (Table 3). About two-thirds of all farming families were considered poor in 1988; this group had an average poverty gap of about one-fourth of the poverty line. The incidence of poverty was equally high among families whose incomes depended mainly on fishing. Their contribution to total rural poverty, however, was much lower (10 percent) than that for farming families, simply because the former group accounted for only 9

percent of all rural families. Families dependent mainly on incomes earned outside farming, fishing, and forestry comprised another single block (about 36 percent) of families in the rural areas.<sup>9</sup> The incidence of poverty among this group was much lower -- about one-half of the families were poor and the average income shortfall for the group was about 15 percent of the poverty line.

A traditional characterization of the rural poor is that the poorest of them are the landless and those who are dependent mainly on wage incomes. Surprisingly, Table 3 shows that, on the average, the intensity of poverty, as indicated by income shortfalls, among the self-employed is as severe, if not more severe, than "wage" households (although there are differences across occupations). In agriculture, the poor self-employed heads of households include primarily lessees, tenants, and small owner-cultivators.

### 3. Explaining Regional Differences in Agricultural Poverty Incidence

Population growth in rural areas has outpaced the opening of new lands for cultivation, particularly since the beginning of the 1970s. The inevitable consequence of the limited growth of employment opportunities in the nonagricultural sectors of the economy has been the continued decline in farm sizes and in cultivable land per unit of agricultural worker. For all farms,

the average farm size fell from about 3.5 hectares in 1960 and 1971 to 2.8 hectares in 1980, the latest census year.

In addition to farm size, tenancy and the size-distribution of operational landholdings have been commonly associated with rural poverty. Indeed, an important feature of post-World War II land reform programs was the prohibition of share tenancy. The argument has been that farmers are poor because of the high incidence of tenancy (the proportion of farms under tenancy to total farms), considered one of the highest in Asia, and which changed only minimally since 1960.<sup>10</sup> The census of agriculture in 1960 indicates that only about 45 percent of the total crop and livestock farms (and 53 percent of the total physical area) was fully owned by the operators themselves. In the 1980 census, this was about 59 percent. The proportion of rented or leased farms, on the other hand, hardly changed, from 37 percent in 1960 to 38 percent in 1980.

The association between rural poverty and size-distribution of agricultural landholdings, on the other hand, is not surprising, considering that landlessness is highly correlated with landholding concentration, and that the landless agricultural workers are among the poorest groups and have little employment opportunities outside of agriculture. Southern Tagalog and Cagayan Valley do not seem to fit this generalization, but note that agriculture has been more diversified in the latter than most of the regions and that, for the former, employment

opportunities outside of agriculture are available partly due to its proximity to Metro Manila.

In systematically assessing the importance of the aforementioned factors in explaining regional differences in agricultural poverty incidence, we have estimated "reduced form" headcount and poverty gap functions using the 1985 and 1988 FIES data. These data are supplemented by regional indicators obtained from various sources. In each function, we have included the following explanatory variables: size distribution of farms (FDIST), expressed as the ratio of physical area above 10 hectares to total area; average farm size (FSIZE); irrigation (IRRIG), expressed as the ratio of irrigated to total farm area; incidence of tenancy, alternatively defined as the ratio of the number of farms under share tenancy to total number of farms (NTENANCY) and as the ratio of area of farms under share tenancy total area of farms (ATENANCY); level of urbanization (URBAN), expressed as the ratio of urban population to total population; and road density (ROAD), defined as the ratio of total road (in km) to total harvested area (in sq. km). IRRIG is a proxy for land quality. The last two variables -- URBAN and ROAD -- are proxies for access to markets and off-farm employment. A dummy variable (YEARDUMMY) reflecting the macroeconomic difficulties in 1985 is also included. All the regression equations take a double-log specification. The regression results are given in Table 4.

All the regression equations explain no less than two-thirds of the variation in regional poverty incidence. FDIST is consistently significant in all regressions, thereby affirming the common observation in the development literature concerning the negative association between operational landholding inequality and rural poverty. FSIZE is significant in half of the six estimated equations. Although IRRIG does not appear to be an important determinant of regional headcount, it contributes significantly to the variation of regional poverty gaps. This suggests that, at the very least, land quality is an important factor contributing to differences in household farm incomes. Neither ROAD nor URBAN is significant. It is, however, possible that these variables could not adequately capture the influence of access to markets and off-farm employment opportunities on poverty in agriculture. Interestingly, tenancy is not significant in all regressions. (We will return to the implication of this result below.) Finally, we note that the severe macroeconomic difficulties in the mid-1980s significantly influenced the incidence of poverty in agriculture.

What the aforementioned observations, as well as many other recent empirical and theoretical studies<sup>11</sup>, suggest is that tenancy by itself is not as important and compelling correlate of poverty as expected: the variation in incomes within tenure classes (reflecting the effect of farm size, yield, cropping intensity, land quality, etc.) has been found to be much greater than the variation between classes.

The common presumption of past land reform designs in the Philippines was that share tenancy would induce resource allocation inefficiencies. That is, since part of the tenant's output goes to the landlord, there is less incentive for the former to apply labor and other inputs to optimum levels. However, recent empirical and theoretical development increasingly shows that the same degree of efficiency can be achieved under the share tenancy contract as, say, under the fixed-fee contract and owner farming. Share tenancy contract also has the added advantage of risk-sharing and tenant-landlord credit relations. Over time and across space, however, contract choice reflects the farmer's (and the landlord's) consideration of economic, social, and sociological factors. In rural environments, for example, where production is risky (and the farmer is risk-averse), both the share tenant and the landlord may find it mutually advantageous to choose the share tenancy contract. In general, in the absence of tightly enforced tenancy regulations, the efficiency of alternative contracts depends on the relative magnitudes of risk, transaction costs, and returns to entrepreneurial ability.<sup>12</sup>

#### 4. Examining the Determinants of Rural Household Welfare

To predict the impact of specific policies on household welfare, it is useful to move beyond explaining differences in *regional* poverty incidence to understand as well which



characteristics of *households* and of the environment in which they live enable them to raise their economic welfare levels. In this section, we attempt to investigate the underlying causal structure of the welfare levels of rural households in the Philippines. For this purpose, we build on the earlier work of Deaton and Muellbauer (1980) and, in large measure, Glewwe (1990). The data used cover all 10,057 rural families in the 1988 Family Income and Expenditure Survey.

Duality theory allows one to express consumer preferences in terms of the expenditure (cost) functions, whose arguments include the prices of goods and services  $(p_1, \dots, p_n)$ , the characteristics of household members, such as their ages and sex  $(a_1, \dots, a_m)$ , and the utility level  $U$  which the household aims to obtain. For analytical convenience, the form of the expenditure function can be restricted so that the vector of household characteristics appears as a distinct function which serves as a multiplicative factor with respect to the rest of the expenditure function. This can be written as:

$$C^h = m(a_1^h \dots a_m^h) E(U; p_1 \dots p_n) \tag{3}$$

where  $C^h$  is the expenditure level of household  $h$  and  $E(\cdot)$  is per capita expenditure.<sup>13</sup> Intuitively, what (3) says is that there exists a per capita expenditure function  $E(\cdot)$  which can be scaled up or down by the multiplicative factor  $m(\cdot)$ . Put differently, if the reference household consists of one adult only, then the cost function of any household  $h$  with demographic characteristics

$(a_1, \dots, a_m)$  is simply the reference household's expenditure function scaled up or down by the number of adult equivalents of the household under consideration.<sup>14</sup>

Comparing the economic welfare of households with different characteristics can be made by dividing (3) by  $m(\cdot)$ . However, in practice, one can never estimate  $m(\cdot)$  without making certain untestable assumptions (Deaton and Muellbauer, 1986). Following Glewwe (1990), we make a further simplification by assuming a linear form of the expenditure function (though quadratic specification is used for certain variables). The function to estimate is:

$$\log C^h = \sum_{i=1}^m \beta_{ai} a_i^h + \sum_{i=1}^n \beta_{ki} K_i^h + e \quad (4)$$

where the  $\beta$ 's are coefficients,  $a_i$  and  $K_i$  are predetermined or exogenous variables, and  $\epsilon$  is a random error term. This specification is simply a reduced-form functional relation of certain underlying structural relationships (labor supply, production function, etc.).

For our purposes, we refer to the  $a_i$  variables as mainly household composition, specifically age and number of household members. The  $K_i$  variables, on the other hand, include: (i) household structure, (ii) human capital and physical assets, and (iii) locational characteristics. The household structure variables comprise the marital status of the household head and the employment status of the household head's spouse.<sup>15</sup> Human

capital variables are represented by the age (and its square) and the educational attainment of the household head. Physical assets, which contribute, directly or indirectly, to household incomes, are proxied by the rental value of owned house and/or lot. In addition, transfers from both domestic and foreign sources can augment the economic resources available to the household. Some of these transfers may be endogenous; poor households are, for example, likely to be recipients of reliefs from private and government sources. Parameter estimate on this variable may thus have a positive bias. Locational characteristics are represented by regional dummies. This last set of variables serves to capture regional differences in infrastructure and the physical and economic environment which can have independent influence on economic rewards to production factors, and hence on rural household welfare. The definitions of these variables are given in Table 5. The results of the regression analysis are reported in Table 6.

Strictly speaking, one can only interpret the estimates in Table 6 as *explaining the variation* in the rural household welfare *conditional* on past decisions concerning the accumulation of stocks of human and physical assets. They do not explain the *process* by which households have accumulated these assets. To the extent that selectivity in asset accumulation takes place, the benefit to a typical household of owning a certain asset could be overstated. Despite this limitation, one can reasonably take these estimates as providing the order of magnitude on the

likely effects of certain government policies on rural household welfare.

As shown by Glewwe (1990), the household composition variables cannot be interpreted as directly affecting household welfare since these variables are also used to control for differences in household composition when using expenditure levels to measure household welfare. Their inclusion, however, allows such interpretation to be made for the other included variables. Thus, below, we skip the interpretation of the household composition variables.

Households headed by men whose wives are not employed -- comprising about two-thirds of the rural households in the 1988 FIES -- tend to have the same level of household welfare as the reference group consisting of households headed by women. But those households headed by men whose wives are employed have, all other things being equal, 11 percent higher level of household welfare than the other types of households. These results suggest that the conventional wisdom that households headed by women tend to be poorer than households headed by men,<sup>16</sup> is only partly correct.

Marital status also affects household welfare. Households whose heads are single, widowed, divorced or separated tend to have lower household welfare relative to those whose heads are married. Yet, as noted above, one should not use these reduced-form estimates as a substitute for estimation of underlying

structural equations, linking marital status, labor force participation, occupational choice, etc.

The household head's working experience is represented by the age (and its square) variable. The statistical significance of the quadratic term of this variable suggests a typical "age-earnings profile" commonly demonstrated in the human resources literature. The other human capital variable, education, is represented by dummy variables. In relation to an otherwise identical household where the household head has either no formal education or only attended but not completed elementary education, a household where the head has completed elementary education has 8 percent higher level of household welfare. For the household where the head attended or completed high school education, the level of household welfare is 20 percent higher than that for the reference household. Finally, a household headed by one who has attended or completed a college education tends to have a level of household welfare 42-71 percent higher than that for the reference household. Again, it bears recognizing that these estimates are conditional on past choices in human asset accumulation, implying that the parameter estimates overestimate the rates of return to education.

The physical asset variables are both positively associated with household welfare. These assets contribute, directly or indirectly, to incomes of households.

The regional dummy variables represent rural areas other than Central Mindanao in Southern Philippines (Region 12). Wide

differences in household welfare across regions are revealed by the parameter estimates. A household in Central Luzon (Region 3), the country's most progressive rural region owing to its proximity to Metro Manila and to massive investments in irrigation by past political regimes, tends to have the same level of household welfare as that in the reference region which, among the country's 12 regions (excluding the National Capital and the Cordillera Autonomous Regions), has the highest land/labor ratio and a relatively less skewed size-distribution of landholdings. A household in Central Visayas (Region 7), a region with highly skewed size-distribution of personal income and of agricultural landholdings, has the lowest level of household welfare. This is followed by a household in Bicol Region (Region 5), the country's most economically depressed region owing to its poor state of rural infrastructure and to natural calamities (i.e., typhoons).

In summary, the variation in the welfare level of rural households is attributed to differences in (predetermined) ownership of human capital and physical assets, in household structure, and in locational characteristics of households. It bears repeating, however, that our reduced-form estimates are conditional on past decisions with respect to the accumulation of human capital and physical assets as well as to the choice of occupation and location. The investigation of the process of accumulation, including migration decisions, is beyond the scope of this paper.

### 5. Poverty Targeting

We can now ask: How can one target the poor in such a way that, given limited budgetary resources, the reduction in total poverty is maximized? Put another way, if subsidies (e.g., food subsidies) are going to be removed owing to, say, budgetary pressure, how could it be done in such a way that the impact on poverty is minimized? Ideally, an efficient policy is one that targets the poor directly. It is, of course, well known that targeting is imperfect owing to a variety of reasons: costly administration of subsidy programs, bureaucratic corruption and rent-seeking activities, leakages arising from imperfect (costly) identification of intended beneficiaries, etc.

To address this issue, we draw on the earlier works of Kanbur (1987) and Kakwani (1990). We maintain our assumption in section two that each household belongs to a mutually exclusive group. Suppose that the income of each household in a particular group, say  $j$ , increases by a fixed equal amount owing to a targeted government program. Then, using (2), we know that the proportionate reduction in total poverty is  $\Delta P_q/P_q = (P_q' - P_q)/P_q$ , where  $P_q'$  is the total poverty incidence after an equal increase in income of  $\lambda$  for all households in group  $j$ . But because the poverty budget is always limited, the reduction in poverty must be compared with the cost of targeting. The cost of targeting the  $j$ th group is equal to the product of the population proportion  $\gamma_j$  and  $\lambda$ . The targeting indicator for group  $j$  can then be written as

$$k_j = \frac{\Delta P_a}{P_a} \frac{1}{\lambda \gamma_j} \quad (5)$$

Intuitively, (5) indicates the proportionate reduction in total poverty associated with a dollar of poverty budget for group  $j$ .

A similar indicator for the whole population ( $\gamma_j=1$ ) can be estimated. Let this indicator be  $k$ . One can think of  $k$  as the proportionate reduction in total poverty associated with highly imperfect (untargeted) transfers. Where  $k$  is used to normalize  $k_j$ , one obtains a measure of the poverty-reduction efficiency of targeted transfers:

$$k_j^* = k_j/k \quad (6)$$

Clearly, where  $k_j^*$  is equal to one, targeting transfers to group  $j$  is neither superior nor inferior relative to a case where the transfers are left untargeted. Where the targeting indicator is greater than one, it is more efficient to target transfers to the group than not to target at all. The normalized targeting indicator reaches a minimum value of zero if there are no poor households in the targeted group. Where the poverty budget allows the targeting of several groups, maximum reduction in total poverty can be obtained by choosing those (mutually exclusive) household groups which have the highest values of  $k_j^*$ .

To implement this procedure, we have classified households according to their spatial (regional) location as well as socio-economic and demographic characteristics. This type of



information is typically available in most household surveys. The results of the exercise are given in Table 7.

A noticeable feature of the exercise is that the ranking of household groups with respect to the value of the targeting indicator is dependent on the poverty measure being employed. Households in Central Luzon, for example, give the second highest value of targeting indicator based on the headcount measure, but the second lowest based on the FGT measure (for  $\alpha=2$ ). This suggests that, based on the first measure, Central Luzon, which has a relatively low poverty incidence (see Table 2), is an appropriate region for targeting, but based on the second measure, it is an inappropriate one. This unusual observation arises from the fact that a large proportion of the population in Central Luzon is clustered around the consumption level which is not significantly lower than the poverty line for the region. The effect of income redistribution has thus little effect on the poverty measure which is sensitive to the distribution of income among the poor.

Based on the distributionally sensitive poverty measure, the following regions and household groups are considered good targets for poverty reduction:

1. Households living in Central Visayas, Bicol Region, and Eastern Visayas;
2. Households in agriculture, mining, and quarrying;
3. Little or no education of household head;
4. Age of household head is 26-45 years;

5. Households with high dependency ratio (child-adult ratio is from 0.5 to 1.0);
6. Large family size (7-12 members);
7. Self-employed heads of households; and
8. Rural families dependent on farming, forestry, and fishing.

One can improve upon the targeting by combining two or more of the above household characteristics. One obtains, for example, that households located in Western Visayas and Bicol Region, whose heads' main source of livelihood is farming, and whose heads are not elementary graduate, are a superior target for poverty alleviation.

A caveat is in order here. An assumption in this exercise is that all the gains of targeting accrue to the group being targeted. If there are substantial leakages of poverty budgets, the targeting indicators overestimate the impact of transfers. It is also possible that the transfers induce changes in household behavior (e.g., in labor supply) which may influence the outcomes of transfers. Where these changes are not negligible, it is important to carefully specify the structural relationships governing consumption decisions, earnings, migration, etc. Finally, the specific policy instruments to effect transfers may matter and these have not been spelled out. Future targeting exercises may have to deal with these and similar issues.

## 6. Concluding Comments

Though there are still unresolved issues in poverty measurement, the indications are that the "war against poverty" in the Philippines will continue for a long time, given the magnitude of the problem, particularly in rural areas, and the economic and political constraints to reforms toward sustained economic growth and poverty alleviation. Based on total household expenditures which can be argued to provide a better indicator of standard of living than total household income, the poor as a proportion of the total population slightly diminished from about 64 percent in 1985 to 58 percent in 1988. The average poverty gap (for the whole population) dropped from about 25 percent in 1985 to 20 percent in 1988. The size-distribution of income during this period hardly changed, suggesting that the little reduction in poverty was brought about mainly by the slow (and unsustained) growth of GDP per capita which averaged about 2 percent annually during the same period.

Sustained, rapid growth of productive employment opportunities represents the key to continued poverty reduction. When this growth is coupled with an improvement in the size-distribution of income and in the poor's access to opportunities for the development of their major asset, their labor, the reduction in poverty can even be faster. For the landless rural poor, access to land offers immediate and lasting benefits. A major land redistribution, however, is not likely forthcoming, given the strong resistance against it by the landed elite, the

magnitude of landlessness, and the government's fiscal constraint. Landlords have, time and again, demonstrated themselves to be politically powerful, and they -- and the nonpoor in general -- have exerted a strong influence on policy.

Improved access to opportunities for the development of the poor's human assets also offers lasting gains for rural poverty alleviation. Among the most important of these are education and vocational training as well as health and nutrition services in rural areas. Rural infrastructure and technology development is another area which can go a long way in increasing rural incomes. But even here, reforms aimed at channeling more of these services to the rural poor, are likely to be met with some resistance from the nonpoor (especially from urban areas), although it is not likely to be as intense as that attendant with land redistribution. The support to these reforms can be enhanced by bringing together the poor and certain nonpoor groups that have interest in seeking reforms. The nongovernmental organizations, private volunteer groups, and development assistance agencies are potentially powerful allies of the rural poor and reform-oriented advocates within the government hierarchy, for poverty-reducing reforms. Unfortunately, the political power and administrative machinery of these groups still remain largely unharnessed.

Finally, we have shown that, given limited poverty budgets, there are high payoffs, measured in terms of the reduction in the overall poverty incidence, in carefully targeting transfers to certain household groups. A logical extension of the analysis is

to explicitly specify the policy instruments required to achieve the transfers.

## NOTES

1. See Balisacan (1991) for a detailed discussion on the limitations and comparability of the various rounds of FIES.
2. For a discussion of the conceptual and empirical issues involved in poverty measurement, see Hagenaaars (1986), Buhmann et al. (1988), Srinivasan (1990), and Atkinson (1991).
3. The poverty line can be argued to be positively related with correlates of development (e.g., urbanization). Ravallion et al. (1990), however, have demonstrated that, for a large number of low-income countries, real poverty lines tend to increase with growth, but they will do very slowly for the poorest countries.
4. See Foster (1984) for a review of the literature on aggregate measures of poverty.
5. These rates of decline were, however, lower than those for other countries of similar income level, based on data in the World Bank's World Development Report 1990 (pp. 45-48).
6. Interestingly, the same basic data from the FIES series were used in these other studies. However, in contrast with this paper, these studies have employed a mixture of definitions with respect to poverty norms, units of analysis, and level of aggregation, thereby making comparison of poverty estimates for various years problematic.
7. See Balisacan (1991) for an analysis of the sensitiveness of poverty estimates to varying levels of poverty line.

8. Average real family income in rural areas increased by 19 percent between 1961 and 1965 and by another 19 percent between 1965 and 1971. In contrast, while average real family income in urban areas increased by 21 percent in the first period, it stagnated in the second period. Thus, the rural-urban income ratio increased from about 40 percent in 1961 and 1965 to 48 percent in 1971.
9. There is over-representation here owing to the lumping of families whose occupations were not declared, into the "other occupation" category.
10. Changes in category definitions of farms do not make the last three censuses of agriculture strictly comparable. Many of the commercial/plantation crops classified as manager-operated farms in the 1971 census, for example, were classified as farms "leased for a fixed amount of money/produce" in the 1981 census. Quisumbing and Adriano (1987, p. 39) conjectured that the 1980 census was meant to "shed less light on distributional matters than its predecessors (not in terms of the design of the census, but in the manner of its reporting)."
11. For an excellent survey of the literature on share tenancy and alternative contractual arrangements, see Otsuka and Hayami (1988) and Otsuka, Chuma, and Hayami (forthcoming).
12. See Otsuka, Chuma, and Hayami (forthcoming).
13. Glewe (1990) also includes the price variables as arguments of  $m(\cdot)$ . This would be appropriate in cases where there are large

differences in relative prices (e.g., urban vs. rural areas). However, in our case, relative price differences for the various rural regions are quite small and hence price variables can be safely ignored in  $m(\cdot)$ .

14. This is a standard assumption employed in the estimation of equivalence scales for the cost of children (see Deaton and Muellbauer, 1980, pp. 193-5; Tsakloglou, 1991).

15. It should be recognized that marital status and the labor force participation of the spouse (i.e., wife) are to some degree themselves influenced by income prospects and other factors. They are thus not entirely exogenously given. On this and related issues, see Behrman (1990).

16. See, for example, World Bank (1989).



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Table 1

 Indices of Poverty Incidence, Selected Years  
 (in percent)

Area	Share of Area in Total Families	Based on Income			Based on Expenditures		
		Head- count	Poverty gap	FGT (n=2)	Head- count	Poverty gap	FGT (n=2)
<b>Rural</b>							
1961	85.87	80.19	45.00	28.00			
1965	75.33	71.15	37.00	24.00			
1971	69.56	66.03	34.00	21.00			
1985	62.16	63.30	29.00	13.00	69.36	27.27	13.52
1988	62.17	54.00	19.00	9.00	62.75	32.56	10.45
<b>Urban</b>							
1961	34.83	65.00	33.00	21.00			
1965	29.67	57.43	26.00	15.00			
1971	36.14	51.32	21.00	12.00			
1985	37.84	51.98	20.00	10.00	56.00	21.59	10.59
1988	37.83	39.95	14.00	4.00	46.53	17.20	7.93
<b>Philippines</b>							
1961	100.00	75.02	39.00	25.02			
1965	100.00	67.00	33.74	21.33			
1971	100.00	61.03	30.08	18.39			
1985	100.00	59.02	23.11	11.32	66.62	25.12	12.41
1988	100.00	48.73	17.11	7.87	57.75	20.56	9.50
<b>Contribution of Rural to Total Poverty</b>							
1961		70.52	71.64	72.10			
1965		76.80	77.13	79.13			
1971		76.90	78.06	80.22			
1985		66.67	67.25	69.11	66.74	67.68	67.71
1988		62.92	69.04	71.14	67.25	69.33	68.61

Table 2

Poverty Indices<sup>a</sup> by Region, (Rural and Philippines), 1988  
(in percent)

Region/ Area	Share of Region in Total Families	Head- count	Poverty gap	FGT (n=2)	Contribution to Total Poverty		
					Head- count	Poverty gap	FGT (n=2)
<b>PHILIPPINES</b>							
National Capital Region	13.63	42.69	12.92	5.43	10.07	8.37	7.83
Iloilo Region	7.30	55.69	17.69	7.37	6.97	6.21	5.67
Cagayan Valley	4.81	62.55	22.19	10.26	5.21	5.20	5.20
Central Luzon	9.86	41.19	11.16	4.27	7.03	5.35	4.43
Southern Tagalog	12.19	56.93	20.62	9.36	12.62	12.24	12.28
Bicol Region	7.01	72.10	28.20	13.52	8.75	9.61	9.90
Western Visayas	9.08	66.61	24.61	11.46	10.47	10.88	10.97
Central Visayas	7.87	66.73	27.10	13.72	9.10	10.39	11.39
Eastern Visayas	5.68	68.34	26.62	12.94	6.72	7.38	7.75
Western Mindanao	5.12	61.76	22.77	10.83	5.47	5.67	5.86
Northern Mindanao	5.76	59.40	21.67	10.20	5.92	6.07	6.19
Southern Mindanao	7.00	60.76	22.32	10.56	7.37	7.61	7.79
Central Mindanao	4.68	60.19	21.13	9.53	4.88	4.81	4.70
<b>R U R A L</b>							
Iloilo Region	5.58	53.57	15.68	6.15	5.15	4.23	3.60
Cagayan Valley	4.14	62.16	21.26	9.59	4.43	4.29	4.18
Central Luzon	3.75	40.60	10.17	3.61	4.04	2.84	2.19
Southern Tagalog	7.98	61.62	23.03	10.87	3.49	8.93	9.14
Bicol Region	9.32	75.92	29.73	14.19	7.27	8.00	8.27
Western Visayas	6.53	68.78	24.66	11.25	7.83	7.89	7.80
Central Visayas	5.36	73.85	30.66	15.78	6.86	8.00	8.57
Eastern Visayas	4.41	67.54	25.29	11.80	5.15	5.42	5.00
Western Mindanao	4.24	62.69	22.86	10.80	4.60	4.71	4.82
Northern Mindanao	3.28	60.21	21.80	10.14	4.66	4.54	4.57
Southern Mindanao	4.67	63.43	24.60	11.66	5.07	5.36	5.51
Central Mindanao	3.89	62.07	21.63	9.76	4.18	4.13	4.00

<sup>a</sup>Based on per capita expenditures.

Table 3

Poverty Indices\* by Industry, Rural Families, 1988  
(In Percent)

Area	Share of Sector in Total Rural Families	Poverty Indices			Contribution to Total Poverty		
		Head- count	Poverty gap	PGT (=2)	Head- count	Poverty gap	PGT (=2)
Total families	100.00	63.66	23.24	11.06	100.00	100.00	100.00
Farming							
Wages	9.39	79.65	31.00	15.00	11.60	12.67	10.71
Self-employed	43.57	70.28	27.00	13.00	48.11	50.41	31.12
Forestry	1.10	65.81	26.00	13.00	1.14	1.23	1.20
Fishing	0.05	76.37	29.00	14.00	10.85	11.26	11.43
Agricultural Services (e.g., agricultural rents)	0.39	62.47	25.00	11.00	0.39	0.42	0.39
Other Occupation							
Wages	18.59	45.53	15.00	7.00	14.17	11.95	11.75
Self-employed	17.90	62.87	16.00	7.00	13.75	12.28	11.31

\*Based on per capita expenditures.

Table 4

## Estimation Results of Agricultural Poverty Incidence Determination Functions: Regional Data

Explanatory Variable	Headcount			Poverty Gap		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.18 (0.69)	0.31 (1.20)	0.18 (0.83)	-0.66 (-1.56)	-0.50 (-1.24)	-0.92 (-3.28)
FDIST	0.21 ** (3.41)	0.24 ** (4.35)	0.23 ** (4.26)	0.39 ** (3.87)	0.39 ** (4.57)	0.35 ** (3.85)
FSIZE	-0.20 (-1.56)	-0.36 * (-2.44)	-0.23 * (-2.35)	-0.27 (-1.31)	-0.40 * (-2.10)	-0.17 (-1.05)
IRRIG	-0.05 (-1.37)	-0.03 (-0.85)	-0.04 (-1.18)	-0.12 * (-2.10)	-0.10 (-1.79)	-0.16 ** (-4.10)
ROAD	-0.12 (-1.32)	-0.15 (-1.49)	-0.10 (-1.20)	-0.12 (-0.81)	-0.15 (-0.99)	
RYENANCY	0.17 (1.45)			0.19 (1.02)		0.23 (1.29)
ATENANCY		0.04 (0.51)	0.08 (1.16)		0.03 (0.22)	
URBAN	0.03 (0.47)	0.05 (0.92)		0.09 (1.04)	0.11 (1.26)	0.05 (0.75)
YEAR/DUMMY	0.09 ** (2.77)	0.09 ** (2.70)	0.08 ** (2.57)	0.18 ** (3.52)	0.19 ** (3.49)	0.17 ** (3.46)
Adj R-square	0.71	0.68	0.68	0.76	0.76	0.76
F-value	6.97	7.82	9.07	11.17	10.39	13.19

Notes: All variables, except YEAR/DUMMY, are in natural logarithm. Figures in parentheses are t-ratios. \*\* indicates significance at 1%; \* at 5%.

Table 5

## Definition of Explanatory Variables: Reduced-form Rural Household Welfare Relations

Variable Name	Definition
KIDS07	Number of children aged below 7 years
KIDS14	Number of children aged 7-14 years
ADULTS	Number of household members aged 15 and above
AGE	Age of household head
AGE2	Square of age of household head
EDUC1	1 if household head completed elementary, zero otherwise
EDUC2	1 if household head attended or completed high school, zero otherwise
EDUC3	1 if household head attended college, zero otherwise
EDUC4	1 if household head completed college
HHWBE	1 if household headed by a man and wife employed, zero otherwise
HHWBE	1 if household headed by a man and wife not employed, zero otherwise
SINGLENS	1 if household head is single, zero otherwise
WIDSEP	1 if household head is widowed or separated, zero otherwise
ASSETS	Rental value of owner-occupied dwelling unit
TRANSFERS	Receipts/remittances from domestic and foreign sources
ELECTY	1 if there is any electricity in the building/house, zero otherwise
REGION1	1 if household is from Ilocos Region, zero otherwise
REGION2	1 if household is from Cagayan Valley, zero otherwise
REGION3	1 if household is from Central Luzon, zero otherwise
REGION4	1 if household is from Southern Tagalog, zero otherwise
REGION5	1 if household is from Bicol Region, zero otherwise
REGION6	1 if household is from Western Visayas, zero otherwise
REGION7	1 if household is from Central Visayas, zero otherwise
REGION8	1 if household is from Eastern Visayas, zero otherwise
REGION9	1 if household is from Western Mindanao, zero otherwise
REGION10	1 if household is from Northern Mindanao, zero otherwise
REGION11	1 if household is from Southern Mindanao, zero otherwise

Table 6

Reduced-Form Household Welfare Relations, Rural Areas  
(Dependent Variable = Log of Household Expenditures)

Explanatory Variable	Coefficient	t-value	Mean
Intercept	8.956	145.06	
AGE	0.007	3.55	44.647
AGE2	-0.000 a/	-4.81	2,183.904
EDUC1	0.080	7.74	0.279
EDUC2	0.179	15.37	0.216
EDUC3	0.347	17.24	0.050
EDUC4	0.539	23.01	0.037
HHMWE	0.104	2.72	0.293
HHMWE	0.037	0.97	0.643
SINGLEMS	-0.123	-2.43	0.015
WIDSEP	-0.053	-1.23	0.037
KIDS07	0.038	9.22	1.095
KIDS14	0.071	21.04	1.293
ADULTS	0.137	41.45	3.082
ASSETS	0.000 a/	39.14	1,539.352
ELECTY	0.257	27.07	0.428
TRANSFERS	0.000 a/	14.31	1,791.774
REGION1	-0.138	-6.73	0.075
REGION2	-0.164	-7.57	0.060
REGION3	-0.031	-1.59	0.092
REGION4	-0.153	-8.51	0.128
REGION5	-0.197	-10.01	0.085
REGION6	-0.092	-4.92	0.102
REGION7	-0.406	-20.52	0.084
REGION8	-0.233	-11.16	0.068
REGION9	-0.108	-5.15	0.066
REGION10	-0.124	-6.17	0.076
REGION11	-0.058	-2.87	0.074
Adj. R-square	-0.589		
F-value	472.977		

a/ Less than one thousandth.



Table 7

Normalized Targeting Indicators for Regions  
and for Various Socio-Economic and Demographic Groups

Region/Area	Value of Targeting Indicator Based on		
	Headcount	Poverty Gap	F G T ( $\alpha=2$ )
<b>A. Regions</b>			
National Capital Region	0.84	0.47	0.39
Ilocos Region	1.17	1.00	0.81
Cagayan Valley	1.19	1.13	1.09
Central Luzon	1.28	0.65	0.47
Southern Tagalog	0.67	0.97	0.92
Bicol Region	1.11	1.36	1.41
Western Visayas	0.72	1.15	1.16
Central Visayas	1.30	1.44	1.59
Eastern Visayas	1.01	1.44	1.39
Western Mindanao	1.28	1.24	1.16
Northern Mindanao	1.13	1.10	1.14
Southern Mindanao	0.87	1.04	1.03
Central Mindanao	1.05	1.07	0.98
<b>B. Sex of Household Head</b>			
Male	1.02	1.05	1.05
Female	0.88	0.71	0.68
<b>C. Age (years) of Household Head</b>			
25 or below	0.90	1.10	0.87
26 - 35	1.07	1.06	1.10
36 - 45	0.75	1.08	1.14
46 - 55	1.11	1.00	0.96
56 - 65	1.10	0.87	0.75
66 and above	1.14	0.86	0.79
<b>D. Educational Attainment of Household Head</b>			
No Grade			
Completed	1.19	1.32	1.35
Elementary			
1st - 5th Grade	0.84	1.35	1.45
Graduate	1.25	1.19	1.17
High School			
1st - 3rd Year	1.10	1.05	0.98
Graduate	1.05	0.75	0.61
College			
Undergraduate	1.05	0.48	0.31
Graduate	0.35	0.17	0.08

Table 7 (cont.)

Normalized Targeting Indicators for Regions  
and for Various Socio-Economic and Demographic Groups

Region/Area	Value of Targeting Indicator Based on		
	Headcount	Poverty Gap	F G T (n=2)
<b>E. Family Size</b>			
1 - 3	1.05	0.66	0.49
4 - 6	1.08	0.99	0.95
7 - 9	0.84	1.27	1.44
10 - 12	0.72	1.37	1.66
<b>F. Child-Adult Ratio</b>			
Less than 0.25	1.14	0.69	0.55
0.25, 0.49	1.00	1.02	0.98
0.50, 0.74	0.86	1.38	1.58
0.75, 1.00	0.34	1.51	1.64
<b>G. Occupation of Household Head</b>			
Professional	0.82	0.40	0.35
Administrative	0.00	0.33	0.00
Clerical	0.58	0.47	0.45
Sales	0.83	0.66	0.61
Service	1.26	0.72	0.69
Agricultural	0.96	1.30	1.37
Production	1.26	0.90	0.83
Workers n.e.c.	0.47	0.50	0.73
<b>H. Economic Sector</b>			
Agriculture	0.95	1.30	1.37
Mining & Quarrying	2.41	1.30	1.25
Manufacturing	1.11	0.77	0.69
Electricity, Gas & Water	0.00	0.76	1.09
Construction	1.19	0.98	0.98
Trade	0.86	0.69	0.60
Transportation	1.14	0.86	0.71
Finance	0.67	0.49	0.35
Services	0.95	0.56	0.49
Others	2.41	1.30	0.93

Table 7 (cont.)

Normalized Targeting Indicators for Regions  
and for Various Socio-Economic and Demographic Groups

Region/Area	Value of Targeting Indicator Based on		
	Headcount	Poverty Gap	F G I (e=2)
<b>I. Class of Worker</b>			
Worked for private employer	1.06	0.96	0.94
Worked for government/ government corporation	0.86	0.41	0.30
Self-employed	1.02	1.18	1.22
Employer in family- operated business	0.55	0.76	0.61
Worked with pay on own family-operated business	0.00	3.21	0.00
Worked without pay on own family-operated business	0.73	0.78	1.15
<b>J. Rural Families by Industry</b>			
<b>Farming</b>			
Wages	0.95	1.43	1.56
Self-employed	1.03	1.31	1.37
Others	0.72	1.03	0.93
Forestry	0.42	1.36	1.30
Fishing	0.77	1.39	1.44
Agri. Services	0.00	0.00	0.00
<b>Other Occupation</b>			
Wages	1.09	0.70	0.63
Self-employed	1.06	0.80	0.72