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On Specifying Poverty Lines

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I. Introduction

In the measurement of poverty, the first problem is the identification of the poor. The poor are those who lack resources to obtain the minimum necessities of life. The poverty line is the level of income that is sufficient to buy the so-called minimum necessities of life. A person is poor if his or her income falls below that line.¹

One of the earlier studies on poverty was done by Rowntree (1901), who defined families to be in primary poverty if their total earnings are insufficient to obtain the “minimum necessities of merely physical efficiency”. He estimated the minimum money costs of food that would satisfy the average nutritional needs of families of different sizes. To these costs he added the rent paid and certain minimum amounts of clothing, fuel, and sundries to arrive at a poverty line for a family of a given size. This poverty line based on the concept of physical subsistence involves a number of serious problems. The main objective of the present paper is to address these problems and to suggest operationally feasible solutions.

This paper provides a critical evaluation of alternative approaches to setting poverty lines. First, the paper develops a theoretical framework, which is used as a basis for evaluating alternative approaches. Second, it applies the proposed theoretical framework to develop poverty lines for Thailand and the Philippines.

II. Absolute or Relative Approach

Rowntree’s approach to specifying poverty line based on the concept of physical subsistence is called the absolute approach to measuring poverty. An alternative approach is the “relative approach”, which defines poverty line in relation to the average standard of living of a particular society at a particular time (Atkinson 1974). This approach is based on the concept of “relative deprivation”, which denotes the deprivation suffered by the worse-off persons in the society relative to the better-off persons.²

1. Van Praag, Hagenars, and Van Weeren (1982) define poverty in terms of welfare. A person is called poor if his or her welfare or utility level falls below a certain level. So they derive a poverty line from the relation between welfare and income. Sen (1987) views poverty even in a broader sense of capability deprivation. According to him, poverty exists when a person lacks the real opportunity of say hunger, undernourishment, or homelessness. In this paper, poverty is viewed in terms of low income, which may be an important factor contributing to the capability deprivation.

2. The term relative deprivation was coined by Stouffer (1949) and subsequently developed by Merton (1957) and Runciman (1966).

The relative approach is widely used in the rich industrialized countries. For example, Fuchs (1969) defined poverty line in the United States as equal to one half of the median family income. Drewnowski (1977) suggested that the poverty line should be equal to the mean income of the society. Under this definition, the poor are those who gain when income becomes more evenly distributed and the nonpoor are those who lose. In Australia, the Commission of Inquiry into Poverty (1975) suggested that a household consisting of head, dependent wife, and two children will be in poverty if its weekly income falls short of 56.6 percent of seasonally adjusted average weekly earnings of wage and salary earners for Australia. The poverty line under this approach changes with the average earnings of the wage and salary earners.

Is the relative approach appropriate to measure poverty particularly in developing countries? We argue that it is not appropriate. In the developing countries, our concern is more with the absolute standard of living than the relative standard of living. We want to ensure that nobody in the society should have a standard of living that is below the "minimum necessary for physical efficiency". Moreover, the relative approach has many serious drawbacks. The most severe criticism is that it may show a reduction in poverty when people's income may be falling all around, resulting in a fall of the standard of living of the poor as well as the nonpoor. A reduction (or increase) in poverty will show up only if there is a change in the relative income distribution. A poverty measure based on a relative approach is, in fact, a measure of inequality. Poverty should then be viewed as an issue of inequality. If that is our view of poverty, then it is unnecessary to specify poverty lines. Instead, we should look at various measures of inequality. Poverty is distinct from inequality. Sen (1983) has put this view as

A sharp fall in general prosperity causing widespread starvation and hardship must be seen by an acceptable criterion of poverty as an intensification of poverty. But the stated view of poverty "as an issue of inequality" can easily miss this if the relative distribution is unchanged and there is no change in the differences between the bottom 20 or 10 per cent and the rest of the society.

Under the relative approach, poverty is completely insensitive to economic growth if the inequality of income does not improve. The only way to reduce poverty will be to reduce inequality. Thus, the impressive economic growth enjoyed by many East Asian countries will play absolutely no role in reducing poverty. This we regard as unacceptable.

If we follow the relative approach within different regions in a country, then the richer regions should have a higher poverty line than the poorer regions because of higher average standards of living. Thus we may have a situation that the richer regions have a higher incidence of poverty than the poorer regions, which may lead to greater government resources flowing to richer regions and few resources to the poorer regions.

Rejection of relative views of poverty must not be confused with being indifferent to the contemporary standard of living of the society. The poverty line should, of course, take into account current standards of living and should only be defined in relation to the living standards of a particular society at a particular time. The poverty threshold must change gradually as the standard of society adapts itself to new conditions. The relative approach implies that the poverty threshold should change monthly or quarterly as data become available. The standard of living of a society is more stable than what is indicated by monthly or quarterly changes in economic situations.

III. Poverty Line Axioms

The poverty line specifies the society's minimum standard of living. It should be fixed across all individuals or in other words, it should be horizontally equitable. Since all individuals are different with respect to their basic needs and they live in different geographical regions facing different prices, we cannot and should not have the same poverty line for all individuals. In order to achieve horizontal equity, the poverty line should be adjusted for the individual circumstances so that all the individuals on the poverty line have the same standard of living irrespective of their circumstances.

What are the important individual circumstances that should be taken into account? First, the individuals vary with respect to their age and sex and, therefore, their food and nonfood requirements are different. For instance, children will require less food than adults in order to maintain an adequate nutritional standard. Similarly, women require less food than men. Thus, the construction of poverty line should take account of different individual needs. This leads us to suggest the following axiom.

Axiom 1: The poverty line should be proportional to individual needs.

If two persons A and B have the same income but person A has greater needs than person B, then clearly, person A will be poorer than person B. Thus, we cannot use the same poverty line for both persons; person A's poverty line should be higher than that of person B. If person A has poorer

health than person B, then person A has to spend a part of his or her income on medical attention and will thus require greater income in order to maintain the same standard of living.

There is another issue of differences in individual tastes. If person A has more expensive tastes than person B, then despite the fact that the two persons have the same income and the same needs, person A will be less happy than person B. Should the poverty line for person A be higher than that for person B because of having expensive tastes? We take the view that the difference in individual tastes is a matter of personal choice and should not be a criterion in the measurement of poverty. We measure poverty so that the government can protect the most disadvantaged persons in the society. The government cannot cater to all those who are unhappy because of their expensive tastes. According to Rawls (1967), A person has to take responsibility for his or her own preferences. Thus, we propose the following axiom.

Axiom 2: If two persons A and B have the same needs and face the same prices, then person A should not have higher poverty line than person B because person A has more expensive tastes than person B.

Ravallion and Bidani (1994) define a poverty profile to be inconsistent if two households deemed to have exactly the same standard of living but located in different regions if one is classified as poor and other as not. Thus, consistency requires that the poverty line be fixed in terms of level of living required. This suggests the following axiom.

Axiom 3: If a person A enjoys a higher standard of living than person B, then the real poverty line for person A cannot be higher than that of person B.

The real poverty line is the nominal poverty line adjusted for regional costs of living differences. This axiom implies that the difference in regional poverty lines for persons with the same needs should be entirely attributed to difference in regional costs of living. The richer regions generally have more expensive tastes, which should not entitle them to have a higher real poverty line. Axiom 3, in fact, follows from Axiom 2.

The “absolute” approach to measuring poverty implies that real poverty line is fixed over time. Thus, the poverty line should change over time only because of changes in prices. This can be expressed as the following axiom.

Axiom 4: A person on poverty line in period t , denoted by z_t should have exactly the same standard of living as the person on the poverty line in period t' , denoted by $z_{t'}$.

This axiom implies that the poverty line should be adjusted over time by means of the true cost of living index, so the observed differences in poverty line measure the real change in the poverty line. So the standard of living implied by the poverty line does not change over time.

IV. Nutritional Requirements

The first step in the construction of poverty lines is to specify the food requirements of individuals or families. An individual may be regarded as nonpoor if he or she has access to an adequate source of food. We assume that an individual has access to adequate food if he or she has access to an adequate source of nutrition. According to Lipton (1988), "access to adequate source of nutrition" is a good indicator of quality of life; health, shelter, education, even mobility, are all reflected in nutritional status, although not in a linear or otherwise simple way.

The determination of nutritional requirements of individuals or families is a difficult task. In order to maintain the required physical efficiency, an individual requires several nutrients (such as protein, fat, carbohydrates, and calories) in adequate amounts, in proper combination and at appropriate times (Gopalan 1983). The FAO has been concerned with the issue of determining the nutritional norms of individuals in different age and sex groups. These norms vary from country to country (and even different groups within a country) depending on factors such as race, climatic conditions, etc.

The question arises as whether these country-specific FAO norms can be used to construct a food basket for poverty measurement. These norms are constructed in order to judge whether or not a particular population is adequately nourished. And the concept of absolute poverty should be closely related to malnutrition in the population. A malnourished person should surely be judged as poor because he or she has failed to meet the basic biological requirements.

Some attempts have been made to measure malnutrition using the FAO norms (Reutlinger and Selowsky 1976). This approach has been severely criticized on the grounds that nutritional requirements vary both interpersonally, i.e., from person to person even of the same age, sex, and physical activity level, and intra-individually, i.e. for the same individual at different points in time (Sukhatme 1977, Srinivasan 1981, and Kakwani 1989).

The measurement of malnutrition in a population is indeed problematic. Still as Sen (1980) argues, “malnutrition can provide a basis for a standard of poverty without poverty being identified as the extent of malnourishment; the level of income at which an average person will be able to meet his nutritional requirements has a claim to be considered as an appropriate poverty line even when it is explicitly recognized that nutritional requirements vary interpersonally around that average”.

The nutritional needs of individuals may be used as a starting point to construct food baskets for poverty measurement. It must be emphasized that these needs of individuals depend on several factors such as age, sex, and activity levels. And, therefore, there cannot be a single food basket for all people living in a country.

Since the nutritional norms vary from country to country depending on factors such as race, climatic conditions, etc., it is important that we adopt norms appropriate for the country being studied.

The nutrients we consume are conventionally divided into six categories: calories, proteins, carbohydrates, fats, vitamins, and minerals. A diet is balanced if the various nutrients appear in it in their required quantities.

Ideally, the construction of food poverty lines must take account all the six nutrients. This will almost be an impossible task. Our focus in this study will be on calorie (energy) deficiency. Recent research in this area suggests that in many countries of Asia, diets are such that protein requirements are met if calorie needs are met.

V. Food Poverty Lines based on Food Energy Intake Method

Having determined the calorie requirements of people of different age and sex, the next task is to find the food basket that would meet these requirements. There can be several food baskets that meet individuals' nutritional needs. One can obtain such a basket using the linear programming technique where the cheapest sources of food meeting the nutritional requirements are calculated. This approach is not advisable. The solution from the linear programming model may not be compatible with the consumption pattern of the population. For the food basket to be realistic, it should reflect the consumption pattern of the population.

Greer and Thorbecke (1986) proposed a method of computing the food poverty line at which a person's food energy intake is just sufficient to satisfy a given required number of person's daily calories. They estimated the following cost-of-calorie function:

$$\ln(X) = a + bC + u, \quad (1)$$

where X is the expenditure on food basket that is actually consumed by a person, C is the number of calories that are obtained from that food basket, and u is the error term. If the population is divided into k homogeneous groups or regions, then one can estimate equation (1) for each of these regions. If R is the recommended calorie requirement, which is the same for all regions, then the food poverty line is estimated separately for each region as

$$Z = \exp(a^* + b^*R),$$

Where a^* and b^* are the coefficient estimates of a and b , respectively. A person is identified as poor if her food expenditure is less than the food poverty line. This poverty line can be interpreted as the food expenditure level at which a typical individual's nutritional needs will be met. Separate food poverty lines are estimated for groups or regions having similar tastes and preferences and facing uniform prices.

Since people also require some basic nonfood items of consumption, the poverty line must also include basic nonfood items in addition to basic food items. To determine the total poverty line, X could be used to represent income or total expenditure. In such a case, equation (1) would represent the inverse of the Engel's type demand curve for calories, when prices and tastes are constant. The corresponding poverty line could then be interpreted as the total income or expenditure level at which a typical individual's nutritional needs will be met (Greer and Thorbecke 1986). Ravallion and Bidani (1994) call this approach as Food Energy Intake (FEI) method. This method with some variations has been used in many countries (Dandekar and Rath 1971, Osmani 1982, Paul 1989).

The FEI method is simple and has modest data requirements. Since separate poverty lines are estimated for each group or region, it takes into account the differences in regional costs of living as well as in food preference. What is the main drawback of this method? Since the regions can differ with respect to their standard of living, their food preferences will also be different. The people living in richer regions will have more expensive tastes and, therefore, will buy fewer and more expensive calories. Thus, the food poverty line for the richer regions will be higher than that for the poorer regions. This method will violate Axioms 2 and 3. This may lead to a situation that the richer regions will have a higher incidence of poverty than the poorer regions. The FEI method cannot separate the effect of regional costs of living differences from the differences in the living standards across the

regions. To separate the two effects, we require the regional costs of living indices. This issue is taken up in the next section.

VI. Determination of Consistent Food Poverty Lines: A New Methodology

Suppose q is the quantity vector for a given food basket and c is a vector that converts quantities of food into calories. Then $c'q$ will be the total number of calories that would be obtained from this basket. Suppose further that p is the vector of prices for the given food basket, obviously $p'q$ will be the total cost of the basket in terms of pesos. Then

$$m = p'q / c'q,$$

will be the cost per calorie.

It is obvious that the different baskets will give different calorie costs. The food basket with expensive items will give lesser calories than that with cheaper food items. The rich people tend to have expensive food basket than the poor people.

Thus the per capita food poverty line of a household can be calculated by multiplying the per capita calorie requirement of a household by m . Since the per capita calorie requirement varies from one household to another depending on the age and sex composition, the different households will have different per capita food poverty line.

The determination of food poverty line critically depends on the calorie cost, which needs to be estimated for every group or region. The following methodology is proposed.

Suppose there are k regions or areas within a country. Define

q_i : vector of quantities of the food basket in the i th region

p_i : vector of food prices in the i th region

where i varies from 1 to k . Then

$$m_{ij} = p_j'q_i / c'q_i$$

is equal to the number of calories that would be obtained by consuming the i th region food basket at the food prices of the j th region. The calorie cost of the i th region is given m_{ii} , which will vary across the regions due to two reasons. First, the regional food costs are different. The calorie cost will be higher for more expensive regions. Secondly, the standard of living varies across the regions. The people in richer regions tend to have expensive food tastes, resulting in a higher per calorie cost.

Thus, m_{ij} estimated separately for each region cannot be used to estimate the region's food poverty line because it can give rise to a situation that the richer regions have a higher real food poverty line than the poorer regions and thus violating Axiom 3. In estimating the calorie cost, we need to control for the regional differences in the standard of living. To do so, we propose to estimate the i th region's calorie cost by the following averaging method.

$$\log m_j = \sum_{i=1}^k f_i \log(m_{ij}), \quad (2)$$

where m_i and f_i are the calorie cost and population share of the i th region, respectively.

The regional differences in calorie costs should be entirely attributed to the regional costs of living differences. This implies that if any two regions have the same price vectors for food, then they should give the same calorie cost. It can easily be seen that this requirement is indeed satisfied by the calorie cost given in (2). Another attractive feature of this method is that the weight given to the standard of living of a region is proportional to the population, which means that every person in the society is given the same weight irrespective of where the person resides.

It has been argued that the choice of the basic needs basket should take account of the people's consumption patterns in each subgroup. Ravallion and Bidani (1994) call this specificity, which implies that we should have a separate food basket for each subgroup or region. As argued above, this will violate the consistency of poverty line in terms of maintaining a constant standard of living (Axiom 3). Thus, there can be a conflict between consistency and specificity. Our methodology controls for the regional differences in the standards of living by fixing the real calorie cost across the regions but at the same time it does not require the same food basket for each region. The people can choose whatever food basket they want to consume as long as the calorie cost is fixed. Thus, the proposed methodology addresses the issue of a conflict that can arise between consistency and specificity.

Ravallion (1998) proposed an alternative method of addressing the specificity issue. He suggested to determine a food basket in each region, which is the average consumption of a reference group fixed nationally in terms of their per capita expenditure. The reference group may be determined by picking those people, who fall in the third decile nationally, when ranked in terms of per capita income or expenditure. Under this methodology, an assumption is made that all persons who

belong to the third decile nationally, enjoy the same standard of living but have different consumption patterns because of the fact that they live in different regions. Thus, the approach fixes the standard of living but not the composition of the food basket used in each region. This approach has one serious problem. Although the people that fall in the third decile may have the same per capita income or expenditure, which is also doubtful, since they live in different regions, they face the different costs of living. Consequently, their standard of living will not be the same. Thus, this approach can also violate Axiom 3. Moreover, a fixation of reference group is ad hoc so we may obtain different results depending on how the reference group is determined.

VII. Nonfood Poverty Line

Having decided upon the food poverty lines, the next problem is to make an allowance for nonfood consumption. Suppose q is the quantity vector of food basket, purchasable at price vector p , one can then set the total poverty line as

$$z = p'q / h, \quad (3)$$

where h is the proportion of total expenditure spent on food. To measure poverty in the United States, Orshansky (1965) specified h to be equal to 0.33, which is equivalent to saying that the poor households should spend about 33 percent of their total expenditure on food.

The above procedure of constructing the nonfood poverty line is based on the famous Engel law, which states that households that spend the same proportion of total expenditure on food enjoy the same level of standard of living. This law must hold only if households face the same relative prices of food and nonfood items. If h is fixed at the same value for all households, it would imply that poverty is completely insensitive to the prices of the nonfood basket. This would cause problems when we measure poverty over time (even across the regions and areas).

Suppose \bar{q} is the vector of nonfood basket purchasable at the price vector \bar{p} then the poverty line will be given by

$$z = p'q + \bar{p}'\bar{q} \quad (4)$$

which on comparing with (3) gives

$$h = \frac{p'q}{z} \quad (5)$$

Suppose in the subsequent period, the price vector of the food basket changes from p to p^* and that of the nonfood basket from \bar{p} to \bar{p}^* then in order to buy the same basket (food and nonfood), we need to incur z^* expenditure which is given by

$$z^* = p'^* q + \bar{p}'^* \bar{q}, \quad (6)$$

which should be the true poverty line in the second period. But if we used (3) as the poverty line, then adjusting it for price changes we would obtain a poverty line

$$\bar{z}^* = p'^* q / h \quad (7)$$

where h is given in (5). The difference between \bar{z}^* and z^* will then be given by

$$\bar{z}^* - z^* = (I - \bar{I}) \bar{p}' \bar{q} \quad (8)$$

where

$$I = \frac{p'^* q}{p' q} \quad \text{and} \quad \bar{I} = \frac{\bar{p}'^* \bar{q}}{\bar{p}' \bar{q}}$$

I and \bar{I} are the Laspeyres price indices for food and nonfood items in the basket. It can be seen from (8) that poverty will be overestimated when the food prices increase at a faster rate than the nonfood prices.

In the determination of the nonfood component of the poverty lines, it is essential to take into account the differences in food and nonfood prices in different regions and areas. The value of h should not be the same for all regions and areas. Its value should vary across regions depending on the relative food and nonfood prices in different regions. So, we fix the value of h for one region in a period, which immediately gives the nonfood poverty line for that region (on utilizing the region's food poverty line). The nonfood poverty line for other regions can then be estimated using the nonfood costs of living indices for different regions. This procedure will ensure that real nonfood poverty line is the same across all regions.

Fixing the food to total expenditure ratio at a certain value may be regarded as ad hoc. Ravallion (1998) suggested estimating the nonfood poverty line using the idea that if a person's total income is just enough to reach the food threshold, anything that a person spends on nonfood items will be considered as basic nonfood needs. This idea is quite attractive and can be implemented quite easily. According to this idea the nonfood poverty line is the household's nonfood expenditure at which the household's total expenditure is equal to the food poverty line.

Since our proposed food poverty line varies across households even within regions, it is not possible to use Ravallion's approach to calculate the Engel ratio. We propose the following modification.

- (1) First calculate the food welfare of a household, defined as the per capita household income multiplied by 100, divided by the household-specific per capita food poverty line.
- (2) Arrange the households in ascending order of food welfare using the household survey data.
- (3) Select the households whose food welfare lies between 90 and 110.³
- (4) Calculate the ratio of food to total income for the individuals belonging to these households.

Using this methodology, the Engel's ratio is estimated for the whole country. Since this ratio should vary across the regions because of regional food and nonfood costs of living indices, so we propose to calculate the ratio for each region using the spatial food and nonfood price indices. We suggest the following formula.

$$\text{Ratio} = h * \text{SPI (food)} / [h * \text{SPI (food)} + (1-h) * \text{SPI (nonfood)}], \quad (9)$$

where SPI (food) is the spatial price index for food and SPI (nonfood) is the spatial price index for nonfood⁴. This formula will ensure that the real nonfood poverty line is fixed across regions.

The total poverty line was then calculated for each household by utilizing the household-specific food poverty line and the region-specific value of the Engle ratio using the following simple formula:

$$\text{Total poverty line} = 100 * \text{Food poverty line} / \text{Ratio}. \quad (10)$$

Thus, our proposed poverty line will be sensitive to the changes in food and nonfood prices. This procedure will ensure that the real food and nonfood poverty lines will be constant across all regions and areas, thus giving consistent poverty lines.

Ravallion and Bidani (1994) proposed to use a regression model in order to estimate the non-food component of the poverty line. Their model takes the form

3. According to Ravallion, we should select households whose income is equal to the food poverty line, which means we should select the households at the point where the household food welfare is equal to 100. Since it is impossible to calculate the ratio of food expenditure to income at a point, it is reasonable to select a range in the neighborhood of 100. We selected a range of food welfare lying between 90 and 110.

4. The methodology to estimate the food and nonfood spatial price index is given in Kakwani and Hill (2001).

$$h_i = \alpha + \beta \ln\left(\frac{y_i}{z_i^f}\right) + \sum_{j=1}^n \phi_j D_{ij} + x_i \pi + v_i$$

where h_i is the food share of household expenditure for i th household, y_i is the per capita consumption expenditure of the i th household, z_i^f is the food poverty line for the i th household, x_i is the vector of other exogenous variables (for example, demographic variables). Because nonfood prices are unavailable, they introduced dummy variables for regions and urban and rural areas to capture differences in relative prices, in the level of public services, and other differences that are not observed. They used this model to estimate the Engel's ratio separately for each region and areas by means of regional and area dummy variables. Given the region, specific food poverty lines and the Engel ratios would immediately give the total poverty lines for each region. Is this procedure legitimate?

The regional dummy variables will capture the effect of relative regional costs of living as well as other effects, which affect the household standard of living. This means that the model cannot separate the effects of regional costs of living from the other variables. How can it do so without knowing the regional cost of living indices? To obtain a consistent set of regional poverty lines, it is essential to know the spatial price indices for both food and nonfood items of consumption. No regression model can help to tackle the problem if we do not know these indices. The poverty literature has given little attention to this issue. A recent paper by Kakwani and Hill (2001), however, provides a comprehensive methodology to construct the regional cost of living indices. They have applied this methodology to construct cost of living indices in Thailand. These indices are presented in the next section.

VIII. Two Country Case Studies

This section presents two country case studies, Thailand and the Philippines.

Thailand

The World Bank was the first to pioneer the technique of estimating poverty lines for Thailand based on nutritional adequacy of the average Thai people. This poverty line, although widely adopted in Thailand, suffers from many serious weaknesses. The first and most serious weakness is that it uses the same norm of 1,978 calories per day for all individuals, irrespective of their age and sex.

This approach implicitly assumes that every individual in Thailand has exactly the same calorie requirements. This assumption cannot be defended in view of the available information on the calorie requirements of Thais.

The second weakness of the World Bank poverty line is that it does not take into account the price differences between the regions and areas (urban and rural). This poverty line is also completely insensitive to changes in prices of food and nonfood items in different regions and areas.

Third, the World Bank poverty line developed in the 1970s cannot be very useful in the present time because of changes in the consumption patterns of Thais and in the population structure, particularly an increase in the number of persons in the more active groups.

This section briefly describes the new poverty lines developed by Kakwani (1998), which was officially adopted by the Thai government on 21 April 1998.

Kakwani's (1998) study adopted the calorie norms of the Thai population, which were obtained by the Ministry of Public Health. Thus, Table 1 based on these norms presents the required calories per day of individuals of different age and sex. It can be seen that calorie requirements vary substantially with age and sex. Children do need much less calories than the adults. Also, males require considerable more calories than females. Recognizing the fact that the households differ with respect to calorie needs, the study allocated the calorie requirements as set out in Table 1 to each household in the survey according to the age and sex of each individual living in it.

Table 1. **Energy Requirement per Day by Age and Sex**

Age	Male	Female
1 to 3 years	1200	1200
4 to 6 years	1450	1450
7 to 9 years	1600	1600
10 to 12 years	1850	1700
13 to 15 years	2300	2000
16 to 19 years	2400	1850
20 to 29 years	2787	2017
30 to 59 years	2767	2075
60 years and more	1969	1747

Having determined the calorie requirements of people of different age and sex, the next step is to find the food basket that meets these requirements. It is obvious that the food basket must take into account the consumption patterns of the population living in different regions and areas. The study utilized nine different baskets, with separate baskets for rural and urban areas in five regions. These baskets provided by the Department of Business Economics, Ministry of Commerce in Thailand contained prices and quantities of 321 items of household consumption, which included 125 food items covering almost all items of food consumed by the populations. This information was sufficient to compute the spatial price indices for municipal areas and sanitary districts within each region (northern, northeastern, central, southern, including Bangkok and its vicinity).⁵

The study computed the spatial price indices for 1992, separately for food and nonfood items of consumption. The indices for other years were computed by utilizing the rural and urban consumer price indices for food and nonfood items, which are available for each region. Thus, the price indices presented in Table 2 are comparable across the regions, areas, and over time.

It can be noted from Table 2 that the index value for Bangkok and vicinity in the municipal areas is set equal to 100. The value of the index for other regions and areas are relative to Bangkok (metropolitan) in 1992. For example, the value of food index for the municipal areas in the northeast region is 83 in 1992. It means that the cost of food in the municipal areas of the northeast region in 1992 is 83 percent of the cost of food in Bangkok in 1992.

The information on average prices and quantities provided by the Department of Business Economics was utilized to compute the cost of each of the nine food baskets in prices of each area within each region. To determine the cost of energy (which can be expressed as calories derived from each baht spent on food), one needs to know the amount of calories provided by each of the nine baskets. These baskets give the food consumption levels in kilograms per month, which were converted to grams per day. These values were then multiplied by the nutrient values for one gram of each food to arrive at the daily calorie content of the basket. The study used the conversion factors supplied by the Nutrition Division of the Department of Public Health, which it estimated using the typical Thai food. These conversion factors give the amounts of calories provided by each food basket. Given the costs of these baskets, one could then compute the calories provided by each basket of expenditure on food. The estimates are presented in Table 3.

5. See Kakwani and Hill (2001) for detailed methodology.

It can be seen from Table 3 that the food basket for the sanitary districts of the central region in 1992 will buy 195 calories per baht in sanitary districts of the central region, but the same basket will buy 163 calories per baht in the municipal areas of the central region. The difference between 195 and 163 is attributed to the price differences between the sanitary and municipal areas of the central region. Similarly, it can be seen that the food basket for the municipal central region will buy only 105 calories per baht in the sanitary central region and 104 calories per hot in the central municipal region. This shows that the cost of energy depends on what basket is chosen. The last column in the table gives the average calories obtained per baht when the averages of all sanitary and municipal baskets are used. The values in this column suggest that the sanitary districts population is receiving its energy at a much lower cost than the municipal population.

Table 2. **Spatial Price Indices for Food and Nonfood Items, Bangkok (1992=100)**

Regions	1988	1990	1992	1994	1996
Sanitary Districts and Villages: Food Items					
North	69.3	74.8	87	86.9	106.1
Northeast	64.4	68.1	86	88.3	105.3
Central	68.7	74.8	87	88.5	108.1
South	77.7	85.4	95	101.9	126.1
Bangkok vicinity	68.7	74.8	87	88.5	108.1
Municipal Areas: Food Items					
North	67.2	72.4	84	86.2	101.1
Northeast	65.4	71.4	83	85.1	99.6
Central	65.8	74.7	86	89.5	105.3
South	74.4	80.6	91	97.1	115.9
Bangkok vicinity	75.1	90.7	100	111.8	131.5
Sanitary Districts and Villages: Nonfood Items					
North	69.7	75.1	83	88.3	94.3
Northeast	72.4	79.1	89	97.2	106.5
Central	74.3	80.7	88	92.6	99.4
South	71.8	79	89	95.3	101
Bangkok vicinity	74.3	80.7	88	92.6	99.4
Municipal Areas: Nonfood Items					
North	79	85.1	93	101.3	108.1
Northeast	82.2	87.6	97	105.8	117
Central	82.2	87.7	95	101.1	109.7
South	81.4	89.8	99	107.4	116.2
Bangkok vicinity	84.9	92.3	100	108.1	116.5

Table 3. **Calories Obtained per Baht from Various Baskets, 1992**

	North	Northeast	Central	South	Bangkok	Average
Sanitary District Basket						
Sanitary District Prices						
North	179	206	200	164	–	187
Northeast	174	206	197	164	–	185
Central	168	194	195	168	–	181
South	164	191	196	174	–	181
Municipal Prices						
North	148	163	168	140	–	155
Northeast	145	163	166	139	–	153
Central	140	150	163	140	–	148
South	132	141	157	138	–	142
Bangkok	135	147	157	134	–	143
Municipal Areas Basket						
Sanitary District Prices						
North	123	136	112	117	111	120
Northeast	113	126	102	107	100	110
Central	115	128	105	111	103	112
South	114	125	106	110	103	112
Municipal Prices						
North	115	126	103	108	100	110
Northeast	109	120	98	103	95	105
Central	114	125	104	109	101	111
South	108	117	99	103	95	104
Bangkok	107	117	97	102	94	103

Since the sanitary baskets are more cost-efficient than the municipal baskets, it was considered appropriate to adopt the average of sanitary baskets as a basis for constructing poverty lines. Thus, the same average food basket was used for all regions, which implies the standard of living for all regions.

Having decided the composition of basket, the next step involves computing the per month cost that would meet the calorie requirements of households. These costs can be obtained by dividing the calorie requirements of household by the calorie per baht as given in the last column of Table 3. The problem is that Table 3 provides calories obtained per baht at 1992 prices. To compute the cost of calories for other years, one would need to obtain the average price of food items in several baskets for each year. These prices are not readily available at least in a published form. A simple

procedure would be to use food price indices given in Table 2 to obtain the calories per baht in different years. Table 4 provides the calories obtained per baht in different years. This table forms the basis for calculating the per month cost that would meet the calorie requirements of households. These costs are calculated by dividing the calorie requirements of each household by the calorie costs given in Table 4. These food costs for each household expressed in terms of baht per month are in fact the food poverty lines, which differ for different households depending on their age and sex composition.

Table 4. **Calories Obtained per Baht Based on Average Sanitary District Basket**

Regions	1988	1990	1992	1994	1996
Sanitary Price					
North	235	217	187	187	153
Northeast	247	234	185	180	151
Central	229	210	181	178	146
South	221	201	181	169	136
Bangkok vicinity	229	210	181	178	146
Municipal Price					
North	194	180	155	151	129
Northeast	194	178	153	149	128
Central	193	170	148	142	121
South	174	160	142	133	111
Bangkok vicinity	190	158	143	128	109

Having decided upon the food poverty lines, the next problem is to make an adjustment for nonfood consumption. This assumption was made on the basis of famous Engel's law, which states that households that spend the same proportion of total expenditure on food enjoy the same level of welfare. To arrive at the nonfood poverty line, it was assumed that the poor people living in Bangkok should spend 60 percent of their income on food. Given the food poverty line, this ratio would immediately give the nonfood poverty line income for Bangkok. The nonfood poverty line for other regions and areas and over time was determined using the spatial nonfood price indices given in Table 2. The total poverty line for each household was then obtained by adding the food and non-food poverty lines. Table 5 presents the per capita per month food poverty line for households of different composition. These are the minimum basic needs of the Thai people of different age and

sex in November 1997. These figures can be updated over time using the regional food and non-food consumer price indices, which are available monthly. Thus, the poverty line can be computed every month as the food and nonfood prices are available.

The poverty incidence was calculated by first calculating the poverty line for each household utilizing Table 5. The household is identified as the poor if its per capita income is less than the per capita poverty line. The three poverty indicators, namely, headcount ratio, poverty gap ratio, and severity of poverty index, derived from the Foster, Greer, and Thorbecke poverty measures are presented in Table 6.

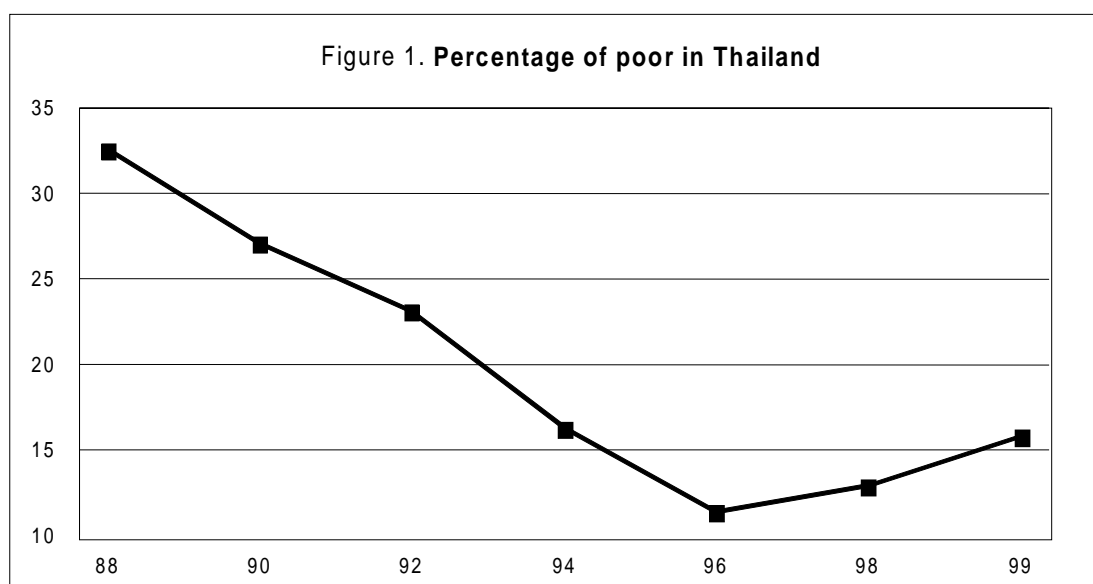
It is noted from Table 6 that the incidence of poverty in Thailand has been declining very rapidly until the onset of the 1997 economic crisis. The percentage of poor declined from 32.6 percent in 1988 to 11.4 percent in 1996 and then increased to 13 percent in 1998. The impact of the economic crisis is still prevalent in 1999, when the percentage of poor increased to almost 16 percent.

Table 5. **Minimum Basic Needs of Persons of Different Age and Sex by Regions, November 1997 (baht per month)**

Age and Sex	Sanitary Districts and Village					Municipal Area				
	North	Northeast	Central	South	Bangkok	North	Northeast	Central	South	Bangkok
Children										
1 to 3	412	463	450	444	450	524	569	563	599	577
4 to 6	498	559	543	536	543	633	688	680	723	697
7 to 9	549	617	600	592	600	699	759	750	798	769
Males										
10 to 12	635	713	693	684	693	808	877	867	923	889
13 to 15	789	887	862	850	862	1005	1091	1078	1147	1105
16 to 19	824	926	899	887	899	1048	1138	1125	1197	1153
20 to 29	957	1075	1044	1031	1044	1217	1322	1307	1390	1339
30 to 59	950	1067	1037	1023	1037	1209	1312	1297	1380	1329
60+	676	759	738	728	738	860	934	923	982	946
Females										
10 to 12	583	656	637	629	637	743	806	797	848	817
13 to 15	686	771	750	740	750	874	948	938	998	961
16 to 19	635	713	693	684	693	808	877	867	923	889
20 to 29	692	778	756	746	756	881	957	946	1006	969
30 to 59	712	800	778	767	778	906	984	973	1035	997
60+	600	674	655	646	655	763	829	819	872	839

Table 6. **Poverty Incidence in Thailand**

Period	Percent of Poor	Gap Ratio	Severity Index	Number of Poor
1988	32.6	10.4	4.6	17.9
1990	27.2	8	3.3	15.3
1992	23.2	6.8	2.8	13.5
1994	16.3	4.3	1.7	9.7
1996	11.4	2.8	1.1	6.8
1998	13.0	3.3	1.2	7.9
1999	15.9	4.3	1.8	9.9



The Philippines

The Government of the Philippines has been deeply concerned about the high incidence of poverty. In 1986, it established a technical working group to determine poverty line and poverty incidence. The National Statistical Coordination Board (NSCB), which coordinates the activities of the Working Group, produces the official poverty estimates on a regular basis.

The official poverty line has been found to have some serious consistency problems. Balisacan (1999), with whose views we completely agree, has forcefully criticized the official poverty lines on the grounds of inconsistency in the sense that the standard of living implied by them varies for each of the regions as well as over time. Another serious drawback of the official poverty lines is that they do not take into account the differing needs of household members. This section develops new poverty thresholds for the Philippines, which correct for the deficiencies in the official poverty lines.

The Philippines's official poverty line is constructed based on the assumption that every individual in each household requires 2,000 calories per day irrespective of his or her age and sex. Since the nutritional norms vary from country to country depending on factors such as race, climatic conditions, etc., it is important that the nutritional norms that are appropriate for the Filipino population are used. Fortunately, these norms are available for different groups of the population from the Food and Nutrition Research Institute (FNRI). Based on these norms, Table 7 presents the individual calorie requirements per day by age and sex. It can be seen from this table that calorie requirements vary substantially with age and sex. A child under one year requires only 700 calories per day, whereas an adult male may require more than 2,500 calories per day. Thus we cannot assume the same calorie requirement of 2,000 calories for each household member.

Pregnant women require more calories than those who are not pregnant. As such, it should be reasonable to add more calories to a pregnant woman accordingly. Thus, 300 additional calories were allocated to each pregnant woman. The calorie requirements of each household in the Philippines's Annual Poverty Indicators Survey (APIS) 1998 were calculated using the information given in Table 7.

To obtain the average calorie requirements of the population, one needs to aggregate the per person calorie requirement for each individual in the sample. This aggregation was performed by means of the weighted average method, where weight is equal to the population weight given to each sample household. The results are presented in Table 8 for urban and rural areas for each region.

Table 7. Calorie Requirements of Filipino People

Age Groups	Male	Female
Less than 1 year	700	700
Between 1 to 3 years	1,350	1,350
Between 4 to 6 years	1,600	1,600
Between 7 to 9 years	1,725	1,725
Between 10 to 12 years	2,090	1,930
Between 13 to 15 years	2,340	2,010
Between 16 to 19 years	2,580	2,020
Between 20 to 39 years	2,570	1,900
Between 40 to 49 years	2,440	1,800
Between 50 to 59 years	2,320	1,710
Between 60 to 69 years	2,090	1,540
Age 70 and over	1,880	1,390

Note from Table 8 that Filipinos in 1998 required an average of 1,985 calories per person per day. A person living in urban and rural areas on average required 1,992 and 1,979 calories per day, respectively. The lower calorie requirement in rural areas is explained by the fact that the rural areas have relatively younger and older people. The average calorie requirements also tend to vary between regions. These differences reflect the differences in population composition that in turn differs depending on regions.

As pointed out, in constructing regionally consistent poverty lines, we require spatial price indices, which measure the relative costs of living between regions as well as between areas. These indices are essential for poverty measurement because they allow one to take into account regional price differences. Balisacan, Ruperto, Toby, Ducanes, and Esguerra (1998) constructed these indices for 1994 for both food and nonfood items of consumption.⁵ We utilize these indices in conjunction with the food and nonfood consumer price indices obtained from the Prices Division of the National Statistical Office (NSO) to construct regional costs of living indices for 1998 (Table 9). The index value for the Philippines is set equal to 100 in 1998. The values of the index for other regions are relative to the Philippines. In 1998, for example, the food index value for the National Capital

5. Balisacan uses the regional Laspeyres price indices, which do not take account substitution effects. Kakwani and Hill (2001) have developed a new methodology that takes account substitution effects.

Table 8. Average Calorie Requirement by Rural and Urban Areas and Region

Regions	Urban	Rural	Both
Ilocos	1,971	1,984	1,980
Cagayan	1,980	1,990	1,988
Central Luzon	1,999	1,994	1,997
Southern Luzon	1,992	1,980	1,987
Bicol	1,976	1,956	1,961
Western Visayas	1,967	1,969	1,968
Central Visayas	1,985	1,976	1,980
Eastern Visayas	1,977	1,957	1,963
Western Mindanao	1,999	1,979	1,985
Northern Mindanao	1,994	1,983	1,988
Southern Mindanao	1,996	1,993	1,994
Central Mindanao	1,986	1,995	1,992
National Capital Region	2,001	-	2,001
Cordillera Autonomous Region	2,001	1,992	1,994
Autonomous Region of Muslim Mindanao	1,999	1,999	1,999
CARAGA	1,999	1,965	1,978
Philippines	1,992	1,979	1,985

Region (NCR) is 126, indicating that the food prices in this region are 26 percent higher than the average price in the nation. The indices clearly show that the NCR is the most expensive region to live in. Overall, the poverty must take into account the regional differences in costs of living in terms of both food and nonfood items of consumption.

The Philippines's National Statistical Office does not provide rural prices so we cannot find the rural–urban costs of living within each region. It will not be appropriate to assume the same costs of living in the rural and urban areas, particularly of food items. So we made an assumption that the food prices in rural areas are 20 percent lower than those in the urban areas. This assumption is ad hoc but it is better than assuming that the rural and urban areas have exactly the same prices.

To determine the food poverty line, we need to know the calorie cost. In other words, we want to find the number of calories that could be obtained by spending one peso on food. The calorie cost will obviously depend on the food basket we choose. The official approach to finding the calorie cost is to specify low cost and nutritionally adequate food menus that would provide 2000 calories per day

Table9. **Regional Cost of Living Indices, Philippines (1998=100)**

Regions	Food	Nonfood	Total
Ilocos	104.5	106.8	104.8
Cagayan	98.1	106.6	101.7
Central Luzon	113.9	106.2	110.1
Southern Luzon	105.7	109.9	107.1
Bicol	96.4	110.7	103.6
Western Visayas	94.4	90.5	92.9
Central Visayas	105.0	108.5	105.9
Eastern Visayas	89.3	97.7	92.5
Western Mindanao	96.5	95.0	96.1
Northern Mindanao	100.8	88.1	95.2
Southern Mindanao	97.2	98.3	97.2
Central Mindanao	95.8	91.2	93.9
National Capital Region	126.1	174.4	146.6
Cordillera Autonomous Region	104.0	104.8	104.2
Autonomous Region of Muslim Mindanao	106.8	101.8	104.8
CARAGA	97.0	95.0	95.9
Philippines	100.0	100.0	100.0

to an individual. These menus are constructed by the FNRI separately for urban and rural areas and for each region. As a result, there are 30 such menus.

The menus for 1991, 1994, and 1997 were constructed on the basis of the Food Consumption Survey conducted in 1988 by the FNRI. These menus are typical of a Filipino diet and representative of the region. The individual items in the menus are valued using average actual prices but applying different prices for the bought and not-bought components.

The per capita cost of each of the 30 food baskets for a daily basis is computed by multiplying the quantities in the basket by the corresponding prices. The monthly costs are then computed by multiplying the per day costs by 30.4. These costs provide 30 alternative food poverty lines separately for rural and urban areas for each of the 15 regions. The food poverty line for the province is the weighted average of the urban and rural lines with the weight being population. Thus, 15 different food poverty lines, one for each region, are utilized to compute the poverty incidence in the Philippines.

The official food poverty line for each region reflects the consumption pattern of the people living in the region, which implies that the standard of living varies for each region. The line will be higher for richer regions because richer people tend to consume dear food items such as meat and seafood that provide more expensive calories. Thus, by construction, the official poverty line implies that the minimum standard of living is not uniform across the regions: richer regions have higher food thresholds than poorer regions. Thus, the official poverty lines violate the basic poverty line axioms given in Section III.

Balisacan (1999) proposes an alternative approach to finding the food poverty line for each region. He uses the food basket for each region for those individuals who belong to the bottom 30 percent of the population that is nationally determined by the per capita income or total expenditure. It is obvious that food baskets for each region would not necessarily give exactly 2,000 calories and thereby Balisacan makes an adjustment to obtain each basket that gives exactly 2,000 calories per person per day. According to his approach, the standard of living for each region is fixed, but not the composition of goods used in each region. This approach makes an implicit assumption that all the people belonging to the bottom 30 percent of the population at the national level would have the same standard of living in each region. Since the cost of living is different for different regions, the same standard of living will not be maintained for every region.

An alternative approach to fixing the standard of living for each region is to fix the cost of calories for each region in real terms. The differences in costs of calories across regions would be entirely attributed to differences in regional food prices. This is the approach we have adopted in this study. This approach fixes the quality of the food basket for each region, but not the composition of the basket.

Balisacan (1999) also finds that one could obtain 95 calories per peso in terms of expenditure on food in 1997 in the NCR. The regional food prices given in Table 3 can then be utilized to calculate the calorie cost in other regions and other years. For instance, the spatial food price index in the NCR in 1998 is 126.1 compared to the index value of 115.4 in 1997, which means that the people living in the NCR in 1998 would be able to obtain $95 \times 115.4 / 126.1 = 87$ calories for one peso of expenditure on food. Similarly, the spatial food price index in the Western Mindanao is 96.5 in 1998 in comparison with the index value of 126.1 in the NCR in the same year. As such, people living in Western Mindanao will be able to obtain $87 \times 126.1 / 96.5 = 114$ calories by spending one peso on food

Table 10. Number of Calories Obtained by Spending One Peso on Food

Regions	Proposed			Official estimates	
	1994	1997	1998	1994	1997
Ilocos	141	114	105	110	89
Cagayan	149	122	112	128	105
Central Luzon	132	106	96	113	90
Southern Luzon	140	113	104	115	88
Bicol	154	121	114	126	98
Western Visayas	158	127	116	128	100
Central Visayas	146	115	104	155	116
Eastern Visayas	154	122	123	149	111
Western Mindanao	162	125	114	144	112
Northern Mindanao	154	121	109	131	101
Southern Mindanao	156	124	113	125	99
Central Mindanao	158	125	114	119	96
National Capital Region	119	95	87	105	82
Cordillera Autonomous Region	140	113	105		
Autonomous Region of Muslim Mindanao	151	114	103	119	94
CARAGA	156	121	113		
Philippines	150	120	110	121	95

in the same year. The calorie costs for different regions are presented in Table 10. The differences in calorie costs given in the table are entirely attributed to the differences in spatial food prices prevailing in the regions. It is noted that Bicol is the cheapest region, where one can obtain 116 calories by spending one peso on food.

Note that calorie costs given in Table 10 are for urban areas. The calorie costs in rural areas will be cheaper by 20 percent, i.e., 20 percent extra calories will be bought with same one peso expenditure on food.

It must be noted that in order to determine the food poverty lines for a particular year, we only require the consumer price indices of food for each region. These indices are readily available every month from the Price Division of NSO. The official poverty approach, on the other hand, requires the average prices of food items in each menu, which are not readily available.

For the purpose of comparison, we also computed the calorie costs from the menus for 1994 and 1997. The results are presented in Table 10. We find that the official estimates of calorie costs are considerably higher than our estimates. For instance, in Western Visayas, the official estimate of calorie cost in 1997 is 100 calories per peso, whereas according to our estimates, one can obtain 127 calories per peso. The menus, which form the basis for the official poverty line estimates, contain a very small number of food items. How realistic are the calorie cost estimates from these menus? The calorie costs used in the present study have been derived from the actual food baskets obtained from the 1997 FIES (as calculated by Balisacan 1999) and should be more realistic than those obtained from the menus that utilized the Food Consumption Survey conducted in 1988. Therefore, it is not surprising to find that the poverty incidence estimates based on the official approach are very high.

Having decided upon the food poverty lines, the next step is to make an adjustment for non-food consumption. So, we need to determine the food to total income ratio for each region. The official approach estimates the food to total income ratio separately for every region using the region-specific food thresholds. Thus, the ratio varies widely across regions. The richer regions will have a smaller ratio than the poorer regions, thereby resulting in higher total poverty lines for the richer regions. According to the Engel law, the richer regions will, therefore, have a higher standard of living than the poorer regions. Hence, the official approach violates the basic idea that the society's minimum standard of living should be the same for every region. In order to maintain the same minimum standard of living across the regions, the variations in the ratio of food to total expenditure should vary only due to the regional differences in the relative prices of food to nonfood items of consumption, so that the real value of the food and nonfood components of total poverty are kept the same for every region and over time.

Given the food poverty line for each household, we estimated the food to total expenditure ratio using the modified Ravallion method described in Section VI. On the basis of the APIS data, the food to total expenditure ratio was calculated to be equal to 68.73 percent. We fixed this ratio for the Philippines in 1998. Since the relative prices of food to nonfood items differ between regions, we need to calculate the ratio for each region so that the real value of food and nonfood components of the total poverty line remains fixed for each region. This was accomplished using the formula given (9). The total poverty line for each region was calculated using equation (10).

Table 11. Total Poverty Line by Age and Sex in Pesos/Person per Month: Urban Areas of the Philippines, 1998

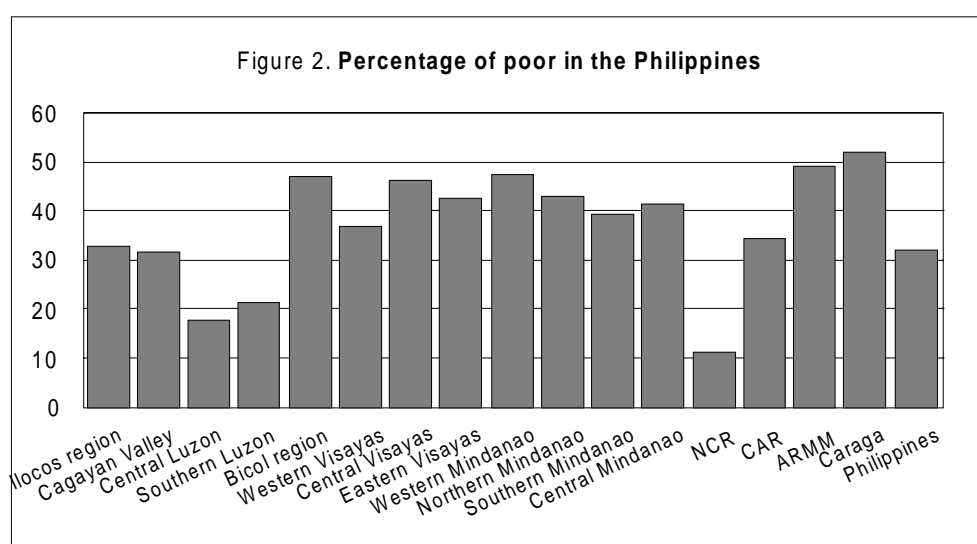
Regions	< 1 year	1-3 years	4-6 years	7-9 years	10-12 years	13-15 years	16-19 years	20-39 years	40-49 years	50-59 years	60-69 years	70 plus
Males												
Ilocos	297	573	680	733	888	994	1096	1091	1036	985	888	798
Cagayan	285	549	651	702	850	952	1049	1045	992	944	850	765
Central Luzon	315	608	720	776	941	1053	1161	1157	1098	1044	941	846
Southern Luzon	302	583	691	745	903	1011	1114	1110	1054	1002	903	812
Bicol	285	550	652	703	851	953	1051	1047	994	945	851	766
Western Visayas	263	508	602	649	786	881	971	967	918	873	786	707
Central Visayas	300	579	686	739	896	1003	1106	1101	1046	994	896	806
Eastern Visayas	260	501	594	640	776	868	958	954	906	861	776	698
Western Mindanao	271	524	620	669	811	907	1001	997	946	900	811	729
Northern Mindanao	274	528	625	674	817	915	1008	1004	954	907	817	735
Southern Mindanao	276	532	630	679	823	921	1016	1012	961	913	823	740
Central Mindanao	267	514	609	657	796	891	983	979	929	884	796	716
National Capital Region	399	770	912	983	1191	1334	1471	1465	1391	1322	1191	1072
Cordillera Autonomous Region	295	568	673	726	880	985	1086	1082	1027	976	880	791
Autonomous Region of Muslim Mindanao	297	574	680	733	888	994	1096	1092	1037	986	888	799
CARAGA	272	525	623	671	814	911	1004	1000	950	903	814	732
Philippines	283	545	646	696	844	945	1042	1038	985	937	844	759
Females												
Ilocos	297	573	680	733	841	898	933	897	851	808	728	656
Cagayan	285	549	651	702	806	862	897	863	818	777	700	631
Central Luzon	315	608	720	776	890	949	984	945	896	851	767	691
Southern Luzon	302	583	691	745	856	914	950	914	866	823	741	668
Bicol	285	550	652	703	808	865	901	868	823	782	704	635
Western Visayas	263	508	602	649	745	794	824	792	750	713	642	579
Central Visayas	300	579	686	739	849	907	942	906	859	816	735	663
Eastern Visayas	260	501	594	640	736	787	819	788	747	710	639	576
Western Mindanao	271	524	620	669	768	819	851	817	775	736	663	598
Northern Mindanao	274	528	625	674	772	822	852	817	775	736	663	598
Southern Mindanao	276	532	630	679	780	832	865	831	788	749	675	608
Central Mindanao	267	514	609	657	754	804	834	801	759	722	650	586
National Capital Region	399	770	912	983	1135	1218	1275	1231	1167	1109	999	900
Cordillera Autonomous Region	295	568	673	726	833	890	924	888	842	800	721	650
Autonomous Region of Muslim Mindanao	297	574	680	733	841	896	930	893	847	805	725	654
CARAGA	272	525	623	671	770	822	853	820	777	739	665	600
Philippines	283	545	646	696	799	853	886	852	808	767	691	623

Table 12. Total Poverty Line by Age and Sex in Pesos/Person per Month:
Rural Areas of the Philippines, 1998

Region	1 year	1-3 years	4-6 years	7-9 years	10-12 years	13-15 years	16-19 years	20-39 years	40-49 years	50-59 years	60-69 years	70 plus
Males												
Ilocos region	257	495	587	633	766	858	946	942	895	851	766	689
Cagayan	247	476	564	608	736	824	909	905	859	817	736	662
Central Luzon	271	522	619	667	809	905	998	994	944	898	809	727
Southern Luzon	261	504	597	644	780	873	963	959	911	866	780	702
Bicol region	248	478	566	610	739	828	913	909	863	821	739	665
Western Visayas	227	437	518	559	677	758	836	832	790	751	677	609
Central Visayas	259	500	592	639	774	866	955	951	903	859	774	696
Eastern Visayas	225	434	515	555	672	753	830	826	785	746	672	605
Western Mindanao	234	451	535	577	699	782	862	859	816	775	699	628
Northern Mindanao	234	452	536	578	700	784	864	861	817	777	700	630
Southern Mindanao	238	459	544	586	710	795	877	873	829	788	710	639
Central Mindanao	229	442	524	565	685	767	846	842	800	760	685	616
CAR	254	490	581	626	759	850	937	933	886	842	759	683
ARMM	256	494	585	631	764	856	943	940	892	848	764	687
CARAGA	235	453	537	579	701	785	865	862	818	778	701	631
Philippines	244	470	557	601	728	815	898	895	850	808	728	655
Females												
Ilocos region	257	495	587	633	729	782	816	787	746	709	639	576
Cagayan	247	476	564	608	701	752	787	759	720	684	616	556
Central Luzon	271	522	619	667	768	822	857	825	782	743	670	603
Southern Luzon	261	504	597	644	743	796	832	802	761	723	651	587
Bicol region	248	478	566	610	705	757	793	766	726	690	622	560
Western Visayas	227	437	518	559	643	689	718	692	656	624	562	506
Central Visayas	259	500	592	639	736	789	825	795	754	717	646	582
Eastern Visayas	225	434	515	555	640	687	719	694	658	625	563	507
Western Mindanao	234	451	535	577	664	711	742	715	678	645	581	523
Northern Mindanao	234	452	536	578	664	710	739	711	674	641	577	520
Southern Mindanao	238	459	544	586	676	724	756	729	691	657	592	533
Central Mindanao	229	442	524	565	651	697	727	700	664	631	568	512
CAR	254	490	581	626	722	774	808	779	738	702	632	570
ARMM	256	494	585	631	726	777	811	781	740	704	634	571
CARAGA	235	453	537	579	667	714	745	718	680	647	582	525
Philippines	244	470	557	601	692	742	774	746	708	673	606	546

Table 13. **Poverty Incidence Based on the Proposed Poverty Line: Philippines, 1998**

Regions	Urban	Rural	Both
Ilocos	26.5	35.9	32.8
Cagayan Valley	22.8	33.9	31.5
Central Luzon	14.6	21.1	17.6
Southern Luzon	13.7	29.6	21.3
Bicol	37.5	50.7	47.1
Western Visayas	25.8	43.5	37.0
Central Visayas	27.3	61.7	46.2
Eastern Visayas	32.6	46.7	42.7
Western Mindanao	27.7	56.7	47.7
Northern Mindanao	32.9	50.5	42.9
Southern Mindanao	24.6	48.1	39.2
Central Mindanao	29.3	46.6	41.6
National Capital Region	11.3		11.3
Cordillera Autonomous Region	8.3	45.1	34.3
Autonomous Region of Muslim Mindanao	51.0	48.5	49.1
CARAGA	43.0	57.4	52.0
Philippines	19.9	43.2	32.1



Tables 11 and 12 present the total poverty lines by age and sex and regions separately for rural and urban areas. It can be seen that a child less than a year old living in urban Western Mindanao will require the income of P271 per month in order to remain nonpoor, whereas an adult male in the age group 20-39 in the same region will require P997 per month. In comparison, the requirement of income for a female aged between 20 and 39 and living in urban Western Mindanao will be P817 per month. On the other hand, a female in the same age group but living in rural Western Mindanao will require P715 per month.

APIS data and the poverty line given in Tables 11 and 12 were used to calculate the incidence of poverty in the Philippines by regions. The results given in Table 13 show that 32.1 percent of the Philippine population were poor in 1998. Poverty incidence varies sharply across regions in the Philippines with a low of 11.3 percent in NCR and a high of 52 percent in CARAGA. Further the results show that poverty in the Philippines is a rural phenomenon with 42.3 percent of the rural population living in poverty. The percentage of population living in poverty in urban areas is 19.9 percent. Rural poverty incidence is highest in Central Visayas and lowest in Central Luzon. The Autonomous Region of Muslim Mindanao accounts for the highest urban poverty incidence.

VIII. Conclusion

The poverty line specifies the society's minimum standard of living to which everybody should be entitled. A person is identified as poor if he or she cannot enjoy this minimum. Obviously, setting poverty lines is not a straightforward exercise and often is most contentious. It involves many conceptual and practical problems, which in most cases are never addressed. This paper has attempted to address these problems and suggests operationally feasible solutions. The theoretical framework that has been developed in the paper has been applied to construct poverty lines for Thailand and the Philippines.

There are two approaches to measuring poverty. First is the "relative approach", which defines the poverty line in relation to the average standard of living enjoyed by the society. It is argued that this approach based on some notion of relative deprivation is not appropriate for the developing countries. Second is the "absolute approach", which implies that all individuals on the poverty line should have the same standard of living irrespective of their individual circumstances. This approach also implies that the real poverty line is fixed over time. The poverty lines used in many countries

do not generally meet these basic requirements. The standard of living implied by the poverty lines varies across regions and time. Thus, we may confront situations when the richer regions have higher poverty than the poorer regions. This paper has provided a methodology to construct poverty thresholds that is consistent in terms of maintaining a fixed minimum standard of living across regions and at the same time takes account of differences in people's consumption patterns.

A clear message that emerges from the paper is that the spatial price indices play a key role in the determination of consistent poverty thresholds across the regions. In the literature, regression models have been used to estimate regional specific poverty thresholds. It is argued that no regression model can separate the effect of regional costs of living from the effect of standard of living. To obtain a consistent set of regional poverty lines, it is essential to know the spatial price indices for both food and nonfood items of consumption. The poverty literature has given little attention to this issue. A recent paper by Kakwani and Hill (2001), however, has provided a comprehensive methodology to construct the regional costs of living indices. This methodology has been used here to construct the regional costs of living for Thailand.

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