Discussion Paper No. 9204 March 1992

Equivalence Scale and Poverty Assessment in a Poor Country

by

Arsenio M. Balisacan

Equivalence Scale and Poverty Assessment in a Poor Country

Arsenio M. Balisacan[*]
University of the Philippines

Abstract

The paper uses household expenditure patterns to estimate equivalence scales for the cost of children in Philippine rural and urban areas. It then employs these estimates in determining aggregate poverty. The paper shows that the practice of assessing aggregate poverty based on total household expenditure (or income) tends to substantially overstate aggregate poverty. In the absence of applicable equivalence scales, much improvement in aggregate poverty assessment in poor countries can be obtained if some attempts are made to fully adjust even only for household size.

Arsenio M. Balisacan
School of Economics
University of the Philippines
Diliman, Quezon City 1101
Philippines

[*]The author is grateful to Angelita M. Cortez for able research assistance.

Equivalence Scale and Poverty Assessment

in a Poor Country

I. Introduction

Mainly because of lack of data, poverty assessment in poor countries has often been conducted on the basis of total household expenditure (or income). A household is considered poor if its total expenditure is less than the poverty line determined for a household of "average" size and composition.[1] This procedure ignores differences in family size and composition as well as scale economies in producing and consuming household goods and services, thereby possibly overestimating aggregate poverty. An improved procedure uses per capita measures. This fully adjusts for family size, although it ignores scale economies. To the extent that a per capita measure is positively but less than proportionately related with household size, as shown in most budget surveys [see, e.g., Kuznets (1979) and Lipton (1983)], the practice overrepresents large households among the poor. And since many poor countries tend to have disproportionately large households, aggregate poverty may still be overblown.

The use of properly constructed household equivalence scales (equivalence scales, for short) is appropriate for aggregate poverty assessment. An equivalence scale indicates at reference prices the cost differential for a household, due to demographic characteristics (e.g., family size, age and sex of family members) and other relevant household attributes (e.g., education, occupation, and region of residence), to reach the welfare level of the reference household. Viewed as a true-cost-of-living index, it represents in one summary measure the changing "needs" of a family as it expands and/or changes its attributes. It has thus been a concept central to theoretical and empirical studies concerning poverty, income distribution, tax policy design, and social security payments in a welfare state.

The literature follows two main approaches to the construction of equivalence scales. The first uses an expert's opinion on the nutritional needs of different age-sex groups to determine them. This approach has, however, not gained wide acceptance since "needs" are usually regarded as a social rather than a physiological concept. Experts are also not likely to agree on what constitutes "correct" needs. Furthermore, needs vary considerably over time and across population groups and regions, since needs depend on environment, work habits, occupation, health and so on. The second approach, the one adopted in this paper, uses observed household expenditure patterns. In developed countries where there are typically many household expenditure surveys (and hence sufficient price variation in the data), the construction of equivalence scales has often involved the estimation of a complete demand system. In many less developed countries, household expenditure surveys are scanty, so that the construction of equivalence scale may have to require the estimation of a single equation model.

This paper provides an empirical assessment of the overestimation of aggregate poverty in a poor country when household size and composition as well as scale economies in household production and consumption are ignored. The first section discusses two models employed in the estimation of equivalence scales. The second section briefly describes the data and the empirical model. The third section then presents the empirical results and the implication of equivalence scales on estimates of aggregate poverty in the Philippines. The fourth section gives the conclusion.

II. Simple Models

One of our main considerations in the construction of equivalence scales is with schemes that are straightforward to implement and that require only data that are likely to be widely available in poor countries. These requirements are met by two of the most popular single-equation models -- the Engel model and the Rothbarth model. The assumptions of these models likewise appear to have found wide favor. We briefly characterize the theoretical underpinnings of these models.

Models of equivalence scales derived from observed household behavior assume that the welfare of the parents is given by

$$u = u(q,x) \tag{1}$$

where q is a vector of household consumption levels and x is a vector of demographic characteristics. Associated with (1) is an expenditure function which relates the minimum expenditure y necessary to attain a utility level u at prices p and household characteristics x:

$$c(u,p,x) = y \tag{2}$$

Then, if u^r and p^r are some reference utility level and price vector, the equivalence scale for any household h with characteristic x^h is derived as the ratio of its cost function to that of the reference household with characteristic x^r,

$$\epsilon^h = c(u^r,p^r,x^h)/c(u^r,p^r,x^r) \tag{3}$$

Whether the equivalence scale estimated from observed household behavior corresponds to this definition -- or whether the true scale can be recovered at all -- has been the subject of recent controversy [see, e.g., Pollak and Wales (1979) and Fisher (1987)]. Another complication with applying this definition is that, as with true-cost-of-living indices, the scale in general depends on the chosen base level of utility or income, as well as on prices and demographic characteristics. Lewbell (1991) constructs an equivalence scale that is independent of a base level of income or utility. Furthermore, note that the definition of equivalence scales given in (3) also assumes that demographic characteristics are not choice variables in their own right, or that changes in demographic characteristics do not affect prices. Modifications to the standard definition have been proposed (see, e.g., Pashardes (1991) and Blundell and Lewbel (1991)], but the suggested procedures are often not amenable to available data in poor countries. Besides, in a number of cases, the issue is an empirical--not a theoretical--matter [Gronau (1988, p. 1191)].

Engel Model

The Engel model rests with the supposition that the standard of living of adults is correctly indicated by the share of food in total household expenditures. This assumption seems to be based on the empirical evidence that (i) for households with the same demographic characteristics, the food share varies inversely with total household income or expenditure and that (ii) for households with the same income, the food share varies directly with the number of children. Denote, following Deaton and Muellbauer (1980, pp. 193-5), the Engel cost function of household h with demographic characteristic x^h as

$$c(u^h, p^h, x^h) = \mu(x^h)\,\Phi(u^h, p^h) \tag{4}$$

where $\mu(x^h)$ is the number of adult equivalents of household h and $\Phi(u,p)$ is the per capita cost function, which is that of the reference household (for which $\mu(x^h)=1$). Intuitively, what (4) says is that the cost function of any household h with demographic characteristics x^h is simply the reference household's expenditure function scaled up or down by the number of adult equivalents of the household under consideration.

Expressing (4) in logarithmic form and then differentiating it with respect to the price of food (p^f), we get the Engel food share equation:

$$s_f^h = \partial \ln c(u^h, p^h, x^h)/\partial \ln p_f = \partial[\ln\mu(x^h) + \ln\Phi(u^h, p^h)]/\partial \ln p_f$$
$$= \partial \ln\Phi(u^h, p^h)/\partial \ln p_f = \zeta(u^h, p^h). \qquad (5)$$

Clearly, assuming that prices are constant, the food share is directly related with the household's utility and, hence, it is an indicator of household welfare. Thus, in this model, two households are considered to be equally well-off if they have the same food share irrespective of their demographic characteristics and incomes.

<u>Rothbarth Model</u>

The Rothbarth model posits that total expenditures on adult goods correctly indicate adult welfare. Suppose that we have a two-way grouping of commodities into pure adult goods (A) and other goods (B). The latter group include items that are consumed by both adults and children, public goods that are jointly consumed, and goods that are consumed only by children. Assume also that the presence of children does not affect the relative prices of A goods. We can then write the Rothbarth cost function for household h as

$$c(u^h, p^A, p^B, x^k) = \alpha(u^h, p^B, x^k) + \gamma(u^h, p^A, p^B) \qquad (6)$$

where p^A and p^B are price vectors for A and B goods, respectively, and x^k is the vector of demographic characteristics for children. The first term, $\alpha(.)$, is the cost of children, and the second term, $\gamma(.)$ can be thought of as the base or fixed cost.

The total expenditure, y, is, of course, $y^A + y^B = p^A A + p^B B$. Applying Shephard's lemma to (6), the expenditure on adult goods is

$$y^A = \sum_{i \in A} p_i \partial\gamma(u^h, p^A, p^B)/\partial p_i = \tau(u^h, p^A, p^B). \qquad (7)$$

Thus, assuming that prices are constant, the well-being of household h is directly related with its consumption of adult goods. Equation (7) also implies that two households with the same consumption level of adult goods are equally well-off irrespective of their demographic characteristics and incomes.

If the nonadult goods (B goods) in the Rothbarth model correspond to food in the Engel model, and if foods are necessities, then the Rothbarth equivalence scale is the same as that of the Engel equivalence scale. In practice, estimates of Rothbarth scales tend to be smaller than those of Engel scales. This inconsistency arises entirely from differences in assumption and not in measurement. Deaton and Muellbauer (1986) demonstrate that while the Engel model tends to overestimate equivalence scales, the Rothbarth model tends to underestimate them. The upward bias in the Engel scale arises because of the likelihood that the addition of a child raises the average food share for the household since the child's consumption is mainly food. The rise in the share will, in the Engel model, indicate that the household welfare has declined. A full compensation (i.e., money) intended to keep the food share and, hence, household welfare, constant will overstate the cost of the child. The equivalence scale is accordingly biased upward.

The downward bias of the Rothbarth scale, on the other hand, arises if the presence of children makes goods that are shared with children more expensive than pure adult goods. In this case, and where the adult goods are normal goods, the consumption of adult goods will rise. Fully compensating the household to keep the adult-good consumption constant (and hence the household welfare) to the level prevailing before the arrival of the child will understate the cost of the child. The equivalence scale is thus biased downward.

As noted above, the search for the "true" equivalence scale measurable from observed behavior is still a continuing effort. While alternative models have been proposed, their application has been limited by the available data in poor countries. In these countries, the Engel and Rothbarth models continue to have empirical appeals.

III. Empirical Specifications and Data

Estimating Equivalence Scales

Consider first the estimating Engel equation for food. One equation that frequently fits the data well is the Working-Leser form, in which the food share is a linear function of the logarithm of total outlay (expenditure). A simple extension of this equation that incorporates demographic composition and other household attributes is:

$$s_f = \alpha + \beta \ln y + \sum_i \omega_i n_i + \sum_j \sigma_j D_j + v \qquad (8)$$

where $\ln y$ is the logarithm of total household expenditure, n_i is demographic composition i, D_j is household attribute j, υ is error term, and α, ~, ω, and σ are parameters. For the demographic composition variables, we classify children into two age groups, those in the age bracket 0-7 years old (denoted LILCHILD) and those in the bracket 7-15 years old (denoted BIGCHILD). The chosen reference household for the construction of equivalence scales is a childless couple.

The household attributes include a set of dummy variables including the region and area (whether urban or rural) of residence of the household, educational attainment and occupation of the household head, and type of household (whether headed by male whose wife is employed, or headed by male whose wife is not employed, or by female). Strictly speaking, because household attributes may themselves be choice variables over a life cycle, the parameter estimates should be viewed as *conditional* on past decisions concerning the accumulation of stocks of human and physical assets. The investigation of the process of accumulation, including migration decisions, is beyond the scope of this paper. Thus, our estimates of equivalence scales have to be interpreted as, following Deaton and Muellbauer (1986), *short-run* indicators of child costs and parental welfare.

The estimation of the Engel equivalence scale requires equating the food share of the reference household with the food share of the household under consideration. Other things being equal, the equivalence scale for a household with children is

$$e^h = y^h/y^r = \exp[-(1/\beta)\sum_i w_i n_i] \tag{9}$$

The procedure for estimating the Rothbarth equivalence scale is similar to the Engel procedure. Using the same formulation as that in (8), we estimate the Engel share equation for adult goods. We then multiply the estimated equation by the total household expenditure (y) to obtain the total expenditure for adult goods (y^A). We next calculate the reference household's predicted expenditure of adult goods (y^A_o), given this household's total expenditure (y^r) and sample mean characteristics. For some other households, for example, one with two adults and one child, we calculate the total expenditure (y^h) that would generate y^A_o. The cost of the child is then given by y^h–y^r and, as before, the equivalence scale by y^h/y^r.

In this paper, the set of adult goods includes coffee and tea, food eaten outside the home, alcoholic beverages and tobacco, personal care and effects, and recreation.

Aggregate Poverty Measurement

As noted above, our main interest in this paper is to assess numerically the bias in estimated indices of aggregate poverty in a poor country when differences in household composition (and other characteristics) are ignored. The assessment involves, first, the identification of the poor and, second, the aggregation of the data on the poor into an overall measure of poverty. There are unsettled issues in both areas, but these are beyond the scope of this paper.[1] In this paper, the poor are identified as those whose expenditures are below the poverty line set at a particular percentage r of the mean adult-equivalent expenditure:

$$z = r(1/N)\sum_{i=1}^{N} y_i/e_i \qquad (10)$$

where e^i is the total number of adult equivalents for household i and N is the total number of households. While this procedure of determining the poverty line is quite arbitrary, its considerable appeal is its simplicity and transparency: it yields results which can be readily understood and serve at least as a starting point for the analysis of poverty.

For the aggregation of the data on the poor, we employ the class of poverty indices proposed by Foster, Greer and Thorbecke (1984), hereafter referred to as FGT. This is given by

$$P_\theta = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z-(y_i/e_i)}{z}\right)^\theta \qquad (11)$$

where q is the number of poor households (having consumption no greater than or equal to z), and $\theta \geq 0$ is a measure of poverty aversion. The parameter θ indicates the importance given to the poorest poor: the larger θ is, the greater is the emphasis given to the poorest households. As the value of θ becomes very large, P_θ approaches a "Rawlsian" measure giving weight only to the poorest among the poor.

Note that the familiar head-count poverty index (H), defined as the proportionate number of the poor, is subsumed in (11), i.e., for $\theta=0$. Also subsumed in (11), for $\theta=1$, is the poverty gap index (PG), defined as the arithmetic mean of the income shortfall (expressed in proportion to the poverty line) over all households. As is well known, the drawback of H and PG is that they are not sensitive to the distribution of living standards among the poor. Where the income shortfalls are the weights themselves, the resulting FGT measure is distributionally sensitive. For example, for $\theta=2$, the resulting measure P_2 in (11) is simply the mean of the squared income shortfalls.

The Data

This study used the Philippine Family Income and Expenditure Survey (FIES) conducted in 1985. For purposes of equivalence scale estimation, we excluded from the sample single-adult households, couples with children whose ages exceed 15 years, retired couples, and extended families (couples living with parents and/or adult in-laws). The consumption pattern of these households were found consistently different from the rest of the sample. Thus, our sample consists of 5,661 households.

Table 1 gives the definitions and means of the variables used in the regression analysis.

IV. Empirical Results

Table 2 summarizes the parameter estimates of the Engel food share equations for urban and rural households. Table 3 presents the Engel share equations for adult goods. F tests indicate that regressions for urban households must be estimated separately from those for rural households. All the estimated equations also fail the White's χ^2-test for the presence of heteroskedasticity. Thus, although the parameter estimates are both unbiased and consistent, they are not efficient and the t-ratios are probably biased. The estimated equations shown in Tables 2 and 3 have been corrected for heteroskedasticity, using the procedure suggested by White (1980).

The coefficients of the demographic composition variables are positive and significant indicating that, as expected, the presence of children increases food share (Table 2). We perform an F test to find out whether the coefficients of LILCHILD and BIGCHILD are statistically different from each other. At 5% level of significance, the test indicates that these coefficients are statistically equal for the food share equations, but not equal for the adult-good share equations. Thus, in equations 2 and 5 of Table 2, we have combined all children into one variable denoted ALLCHILD. This variable, together with the logarithm of expenditure, explains 33 percent of the variation in food shares for rural households and 52 percent for urban households. Equations (3) and (6) introduce a vector of other relevant covariates aiming to control for other household attributes affecting consumption patterns, but these variables increase only minimally the explained proportion of the dependent variable's variation. This result is consistent with the frequently noted case that outlay and household size typically provide the bulk of the explained variation in food shares (Deaton et al., 1989, p. 728).

Based on Table 2, the cost of a child to a rural childless couple is 20.1 percent. For the urban childless couple, it is 17.7 percent. These estimates are slightly lower than those typically reported for developed countries (Buhmann et al., 1988), although somewhat comparable with those reported for some developing countries (Deaton et al., 1989). Estimates of the cost of a child based on the Rothbarth procedure are, as expected, less than those based on the Engel procedure. As noted above, the Engel procedure tends to overstate the cost of a child and, hence, the equivalence scale, while the Rothbarth procedure probably understates them. The true cost, as Deaton and Muellbauer (1986) has shown, is probably somewhere between the two estimates. Based on Table 3, the cost of a child to a rural childless couple is about 8 percent, while that for an urban childless couple is 5 percent. These estimates are extraordinarily low, possibly due to the unresponsiveness of some of the commodities classified as adult goods to changes in income or total expenditure (particularly alcohol and tobacco).

For purposes of illustrating the difference that poverty equivalence scales make on aggregate poverty estimates in poor countries, we use the equivalence scales implied in food share equations (3) and (6) of Table 2. The chosen alternative poverty lines are 50 percent (lower limit) and 75 percent (upper limit) of the mean adult-equivalent expenditure. The results are shown in Table 4. For comparison, we also estimate aggregate poverty indices based on *per capita* expenditure and on *total* household expenditure. The poverty line for the per capita measure is simply a given percentage of the mean per capita household expenditure. On the other hand, the poverty line for the total measure is a given percentage of the mean household expenditure. The aggregate poverty indices for these two measures are also shown in Table 4.

Poverty estimates based on total household measures are substantially higher than those based on adult equivalent measures.

The overestimation is more serious for poverty indices that take into account the poor's welfare deficits. Using the upper limit poverty line, the total household measure overstates head-count poverty by 15 percent, the poverty gap by 34 percent, and the distributionally sensitive FGT (α=2) poverty index by 56 percent. The use of per capita measures reduces the error on estimates of aggregate poverty, although the error is still relatively large for indices that take into account the poor's poverty deficits. While the magnitude of aggregate poverty estimates is sensitive to the assumed poverty line, the direction of the error is robust with respect to this line.

IV. Conclusion

Mainly because of lack of data, researchers use total household expenditures (or incomes) in assessing aggregate poverty in poor countries. There is no adjustment made for differences in household size and composition as well as in scale economies in producing and consuming household goods and services. We have shown that this practice tends to exaggerate aggregate poverty in these countries. The use of per capita measures reduces the error. Thus, in the absence of reliable equivalence scales, much improvement in aggregate poverty estimates in poor countries can be obtained if some attempts are made to fully adjust *even only* for household size.

These results are still quite limited. It would be useful to extend the analysis, e.g., using other classes of aggregate poverty indices (e.g., the familiar Sen index) as well as income distribution indices. An examination of the robustness of equivalence scale estimates in relation to estimating functional forms, choice of reference household, and household survey data would likely yield valuable insights for applied welfare analysis in poor countries.

Notes

1.See, e.g., Fields (1989) and World Bank (1990) for actual empirical cases.

2. For a review of the various approaches to distinguishing the poor from the non-poor, see Callan and Nolan (1991). On the diversity of judgments concerning the aggregate measurement of poverty, see Atkinson (1987).

References

Atkinson, Anthony B., 1987, On the measurement of poverty, *Econometrica* 55, 749-764.

Blundell, Richard and Arthur Lewbel, 1991, The information content of equivalence scales, *Journal of Econometrics* 50, 49-68.

Buhmann, Brigitte, Lee Rainwater, Guenter Schmaus, and Timothy M. Smeeding, 1988, Equivalence scales, well-being, inequality, and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) Database, *Review of Income and Wealth* 34, 115-142.

Callan, Tim and Brian Nolan, 1991, Concepts of poverty and the poverty line, *Journal of Economic Surveys* 5, 243-261.

Deaton, Angus S., Javier Ruiz-Castillo, and Duncan Thomas, 1989, The influence of household composition on household expenditure patterns: theory and Spanish evidence, *Journal of Political Economy* 97, 179-200.

Deaton, Angus and John Muellbauer, 1980, *Economics and consumer behavior* (Cambridge University Press, Cambridge).

Deaton, Angus S. and John Muellbauer, 1986, On measuring child costs: with applications to poor countries, *Journal of Political Economy* 94, 720-743.

Fields, Gary S., 1989, Poverty, inequality, and economic growth, Mimeo. (Cornell University, Ithaca).

Fisher, Franklin M., 1987, Household equivalence scales and interpersonal comparisons, *Review of Economic Studies* 54, 519-524.

Foster, James E., Joel Greer and Erik Thorbecke, 1984, A class of decomposable poverty measures, *Econometrica* 52, 761-766.

Gronau, Reuben, 1988, Consumption technology and the intrafamily distribution of resources: Adult equivalence scales reexamined, *Journal of Political Economy* 96, 1183-1205.

Kuznets, Simon, 1979, *Growth, population, and income distribution: selected essays* (Norton, New York).

Lewbel, Arthur, 1991, Cost of characteristics indices and household equivalence scales, *European Economic Review* 35, 1277-1293.

Lipton, Michael, 1983, Labor and poverty, World Bank working paper No. 616 (World Bank, Washington, D.C.).

Pashardes, Panos, 1991, Contemporaneous and intertemporal child costs: Equivalent expenditure vs. equivalent income scales, *Journal of Public Economics* 45, 191-213.

Pollak, Robert A. and Terence J. Wales, 1979, Welfare comparisons and equivalence scales, *American Economic Review 69 (Papers and Proceedings)*, 216-221.

Tsakloglou, Panos, 1991, Estimation and comparison of two simple models of equivalence scales for the cost of children, *Economic Journal* 101, 343-357.

White, H., 1980, A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity, *Econometrica* 48, 817-838.

World Bank, 1990, *World development report 1990* (Oxford University Press, for the World Bank, Oxford).

Table 1
Definition of Variables

Variable Name	Definition	Mean Rural	Mean Urban
Wf	Share of food in the total HH expenditure	0.56	0.46
LnX	Logarithm of total HH expenditure	9.49	10.03
LILCHILD	Number of children aged below 7 years old	1.47	1.35
BIGCHILD	Number of children aged 7-14 years old	1.15	1.16
ALLCHILD	Total number of children aged below 15 years old	2.62	2.51
AGE	Age of HH head	44.17	44.91
SQAGE	Square of the age of the HH head	2127.62	2187.02
EDUC1	1 if HH head attended or completed elementary, 0 otherwise	0.48	0.30
EDUC2	1 if HH head attended or completed high school, 0 otherwise	0.20	0.33
EDUC3	1 if HH head attended college, 0 otherwise	0.04	0.13
EDUC4	1 if HH head completed college, 0 otherwise	0.03	0.14
OCC1	1 if the occupation of the HH head is service- or production-related, 0 otherwise	0.12	0.29
OCC2	1 if the occupation of the HH head is transport- or communication-related, 0 otherwise	0.04	0.10
OCC3	1 if the occupation of the HH head is in clerical or sales work, 0 otherwise	0.04	0.15
OCC4	1 if the occupation of the HH head is professional or manegerial, 0 otherwise	0.02	0.08
OCC5	1 if the occupation of the HH head is agriculture-related or farming, 0 otherwise	0.64	0.18
HHMWE	1 if the HH head is male and wife is employed, 0 otherwise	0.29	0.35
HHMWNE	1 if the HH head is male and wife is not employed, 0 otherwise	0.69	0.57
REGION1	1 if region is Region 1, 0 otherwise	0.09	0.05
REGION2	1 if region is Region 2, 0 otherwise	0.07	0.03
REGION3	1 if region is Region 3, 0 otherwise	0.09	0.10
REGION4	1 if region is Region 4, 0 otherwise	0.13	0.16
REGION5	1 if region is Region 5, 0 otherwise	0.09	0.04
REGION6	1 if region is Region 6, 0 otherwise	0.10	0.07
REGION7	1 if region is Region 7, 0 otherwise	0.08	0.06
REGION8	1 if region is Region 8, 0 otherwise	0.07	0.04
REGION9	1 if region is Region 9, 0 otherwise	0.07	0.03
REGION10	1 if region is Region 10, 0 otherwise	0.06	0.05
REGION11	1 if region is Region 11, 0 otherwise	0.08	0.08
REGION12	1 if region is Region 12, 0 otherwise	0.07	0.04

Note: HH = household

Table 2
Parameter Estimates of Engel Food Share Equations

	Rural			Urban		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	1.709 (56.63)	1.706 (56.86)	1.599 (40.83)	1.740 (61.62)	1.742 (62.15)	1.643 (42.85)
LnX	-0.127 (-39.22)	-0.127 (-39.31)	-0.120 (-35.19)	-0.133 (-47.27)	-0.134 (-47.6)	-0.129 (-43.05)
LILCHILD	0.021 (14.44)			0.023 (13.31)		
BIGCHILD	0.023 (15.87)			0.021 (13.40)		
ALLCHILD		0.022 (21.77)	0.022 (21.63)		0.022 (18.48)	0.021 (17.70)
			+ other variables			+ other variables
Adjusted R-square	0.332	0.332	0.355	0.517	0.517	0.538
F Value	559.3	838.7	72.5	815.7	1223.6	99.7

Note: Figures in parentheses are t-ratios.

Table 2
Parameter Estimates of Engel Food Share Equations

	Rural			Urban		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	1.709 (56.63)	1.706 (56.86)	1.599 (40.83)	1.740 (61.62)	1.742 (62.15)	1.643 (42.85)
LnX	-0.127 (-39.22)	-0.127 (-39.31)	-0.120 (-35.19)	-0.133 (-47.27)	-0.134 (-47.6)	-0.129 (-43.05)
LILCHILD	0.021 (14.44)			0.023 (13.31)		
BIGCHILD	0.023 (15.87)			0.021 (13.40)		
ALLCHILD		0.022 (21.77)	0.022 (21.63)		0.022 (18.48)	0.021 (17.70)
			+ other variables			+ other variables
Adjusted R-square	0.332	0.332	0.355	0.517	0.517	0.538
F Value	559.3	838.7	72.5	815.7	1223.6	99.7

Note: Figures in parentheses are t-ratios.

Table 3
Parameter Estimates of Engel Share Equations for Adult Goods

	Rural			Urban		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.674 (13.40)	0.079 (13.58)	0.981 (15.02)	0.941 (16.69)	0.953 (17.02)	1.026 (13.39)
LnX	-0.057 (-10.59)	-0.058 (-10.73)	-0.078 (-13.71)	-0.079 (-14.03)	-0.080 (-14.28)	-0.100 (-16.66)
LILCHILD	-0.005 (-2.05)		-0.004 (-1.66)	0.002 (0.61)		0.003 (0.92)
BIGCHILD	-0.008 (-3.56)		-0.006 (-2.81)	-0.006 (-1.98)		-0.005 (-1.57)
ALLCHILD		-0.007 (-4.03)			-0.002 (-1.03)	
			+ other variables			+ other variables
Adjusted R-square	0.047	0.047	0.079	0.085	0.084	0.125
F value	56.7	83.6	12.0	71.4	105.3	13.0

Note: Figures in parentheses are t-ratios.

Appendix Table 1
Parameter Estimates of Engel Share Equations

	Food				Adult Good			
	Rural		Urban		Rural		Urban	
	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratios	Coefficient	t-ratios
Constant	1.599	40.83	1.643	42.85	0.981	15.02	1.026	15.39
LnX	-0.130	-35.39	-0.129	-43.05	-0.078	-13.71	-0.108	-16.66
LILCHILD					-0.004	-1.66	0.003	0.92
BIGCHILD					-0.006	-2.81	-0.005	-1.57
ALLCHILD	0.022	21.63	0.021	17.70				
AGE	0.001	1.51	0.001	0.48	-0.003	-2.08	0.006	3.00
SQAGE	-0.000	-1.65	-0.000	-0.18	0.000	2.50	-0.000	-2.51
EDUC1	-0.004	-0.96	0.009	1.24	0.006	0.82	-0.022	-1.47
EDUC2	-0.004	-0.67	0.007	0.98	0.016	1.71	-0.010	-0.69
EDUC3	-0.008	-0.86	-0.001	-0.14	0.017	1.03	0.004	0.25
EDUC4	0.005	0.44	0.008	0.82	0.024	1.25	0.034	1.82
OCC1	-0.009	-0.96	-0.001	-0.10	-0.002	-0.13	0.021	1.40
OCC2	-0.008	-0.71	0.001	0.10	-0.028	-1.42	0.037	2.19
OCC3	-0.009	-0.73	0.009	1.25	0.013	0.61	0.010	0.65
OCC4	-0.027	-1.70	-0.001	-0.08	-0.010	-0.36	0.042	2.15
OCC5	0.000	0.03	0.020	2.67	-0.021	-1.49	0.036	2.34
HEMWE	0.002	0.15	0.009	1.15	-0.033	-1.68	-0.006	-0.37
HEMWNE	0.012	1.05	0.004	0.47	-0.037	-1.87	-0.021	-1.31
REGION1	0.012	1.11	0.032	3.07	-0.028	-1.52	-0.013	-0.63

Table 4
Aggregate Poverty Measures a/
(In percent)

	Poverty Line	
	0.50 of Mean Expenditure	0.75 of Mean Expenditure
A. Adult-Equivalent Basis		
Head-count	21.79	48.03
Poverty gap	5.52	15.28
FGT (a=2)	1.76	6.52
B. Per-Capita Basis		
Head-count	24.79	50.03
Poverty gap	6.90	17.28
FGT (a=2)	2.76	7.52
C. Household Basis		
Head-count	29.66	55.46
Poverty gap	9.06	20.40
FGT (a=2)	4.03	10.17

a/ Weighted average of rural and urban households.