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WHO RECEIVES WHICH TYPES OF LAKASS INTERVENTIONS IN ABRA?

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Using data on 162 household beneficiaries of the *Lalakas ang Katawang Sapat sa Sustansiya* (LAKASS) program in Abra, we estimate an ordered probit model to explore the associations between the type of interventions received by these households and their socioeconomic and demographic characteristics. Our results show that the degree of LAKASS interventions received may be systematically identified by the ages of the wife and the undernourished child, the occupation of the husband, and the income class of the household. Moreover, analysis of the marginal effects of these variables suggests that poorer families as well as those with younger children and mothers, all of whom are likely to need more assistance, did tend to receive more from the LAKASS program.

1. Introduction

When social programs are implemented, the explicit criteria (as written in the operations manual) for identifying the target clientele as well as for assessing whether beneficiaries receive the appropriate interventions do not always coincide with the criteria operationalized on the field. Several reasons can be cited for this disparity: Within certain bounds, rules, such as those for means testing, are usually open to different subjective interpretations. They are often incomplete and do not cover all the cases found

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in the field. And even if it were possible to draw up an exhaustive list of regulations, monitoring compliance may still turn out to be too costly. Consequently, project officials usually retain some discretionary powers which allow them to exercise their preferences on certain aspects of program implementation.

In view of this administrative flexibility, investigating whether the profile of the recipients of various types of interventions matches that of the intended beneficiaries is an important and useful evaluation activity. For, presumably, it can be inferred that the more closely the socioeconomic and demographic profile of the actual beneficiaries conforms with that of the ideal target clientele, the more faithfully did the project's implementation adhere to its terms of reference.

In this paper, we seek to provide a profile of the *average* household beneficiary of the *Lalakas ang Katawang Sapat sa Sustansiya* (LAKASS) Program in Abra. We do so by formulating and estimating an ordered probit model that relates the socioeconomic and demographic characteristics of the household beneficiaries with the type of interventions they received. The results of our regression, which are reported in Section 5, allow us to answer the question, "Which socioeconomic and demographic factors are instrumental in determining the particular combination of LAKASS interventions received?" In addition, they allow us to perform counterfactual simulations on which type of intervention a household with a given set of socioeconomic and demographic endowments would have been most likely to receive had it participated in the LAKASS Program in Abra.

To set the stage for the estimates, we provide an overview of the LAKASS Program in the next section. We then describe our ordered probit model and dwell briefly on the rationale for its formulation and use in this evaluation exercise in Section 3. In Section 4, we supply information on the data set and the variables used to implement the model. Following the presentation of our

findings, in the final section, we discuss the limitations and significance of the study, and provide some critiques on project implementation.

2. The LAKASS Program

Lalakas ang Katawang Sapat sa Sustansiya (LAKASS) is a community-based initiative of the National Nutrition Council (NNC), which aims to alleviate the problems associated with undernutrition in selected nutritionally deprived municipalities (NDMs). Funded by grants of P26.9 million and P35 million from the RP-Japan Increased Food Production Program of the National Agricultural and Fishery Council, the Program targets families who are most abused by or are at highest risk to malnutrition, providing them with direct nutrition services and better livelihood opportunities.

LAKASS assistance takes the form of an outlay of funds by the NNC of up to P230,000 to each selected NDM. As much as 80 percent of these funds are made available as loans to community projects that address problems related to undernutrition, such as incremental food production ventures, the construction of sanitary toilet facilities and potable water systems, the development of nutrition education materials, and small scale income-generating activities (e.g., animal breedings and food vending). Twenty percent of the funds are set aside for nutrition services, such as vitamin supplementation and supplementary feeding activities, particularly for pre-school children, pregnant women, and lactating mothers.

3. An Ordered Probit Model

Preliminary data analysis revealed that LAKASS interventions in Abra had an ordered structure: Households that were deemed to require the least assistance received food supplements for their undernourished child in exchange for mothers having to attend a nutrition class. Households whose incomes needed augmenting received animals to raise

in addition to food supplementation and nutrition education for mothers. Households who gained the most received not only the first two forms of aid, but also benefitted from the construction of a potable water delivery system.

Thus, to denote the level of assistance received by a household, a trichotomous variable I may be posited where

$$I = \begin{cases} 1 & \text{if the household received minimal assistance} \\ 2 & \text{if the household was a beneficiary of the animal raising project as well} \\ 3 & \text{if the household benefitted additionally from the potable water delivery project.} \end{cases}$$

By design, LAKASS Program interventions were decided upon through a series of steps involving the household beneficiaries themselves, barangay, municipal, and provincial officials, and the National Nutrition Council (NNC). Consequently, while the beneficiaries would all have wanted to receive Type 3 aid as defined above, what they actually got depended on both the explicit and implicit criteria adopted by local government officials and the NNC in the implementation of the LAKASS projects.

To formalize this, we assume that the operational criteria can be written as a linear function of a household's observable socioeconomic and demographic characteristics as well as of other factors:

$$I^* = \beta'\mathbf{x} + \varepsilon,$$

where I^* is a latent variable which may be taken as a household's score based on both the explicit and implicit criteria adopted, $\mathbf{x}$ is a vector of observable socioeconomic and demographic factors, β is the set of coefficients to be estimated, and ε is an unobservable random disturbance term which captures the effects of other factors, *e.g.*, the preferences of barangay and municipal officials.

Since a scoring system can be arbitrarily scaled, the relationship between a household's score I^* and the type of assistance actually received I may be cast as follows:

$$I = \begin{cases} 1 & \text{if } I^* \leq 0 \\ 2 & \text{if } 0 < I^* \leq \mu \\ 3 & \text{otherwise.} \end{cases}$$

Or, in words, a household receives Type 1 assistance if its operational criteria score is less than or equal to zero, Type 2 aid if its score is between zero and some upper threshold level μ, whose value is to be estimated, and Type 3 assistance if its score is greater than μ.

Under the additional assumptions that the disturbance term ε is orthogonal to $\mathbf{x}$ and independently and identically distributed as a standard normal random variable across the household beneficiaries, our model becomes a standard ordered probit model. Unbiased and efficient estimates of its parameters μ and β may be obtained by using the method of maximum likelihood, which involves the maximization of the following log-likelihood function:

$$\ln L = \sum_{t=1}^{T} \{I_{t1} \ln \Phi(-\beta'\mathbf{x}_t) + I_{t2} \ln [\Phi(\mu - \beta'\mathbf{x}_t) - \Phi(-\beta'\mathbf{x}_t)] + I_{t3} \ln [1 - \Phi(\mu - \beta'\mathbf{x}_t)]\},$$

where the variables have been indexed by t to denote the tth household in the sample, $t = 1, 2, \ldots, T$,

$$I_{tj} = \begin{cases} 1 & \text{if } I_t = j,\ j = 1,2,3 \\ 0 & \text{otherwise,} \end{cases}$$

and $\Phi(\cdot)$ is the cumulative distribution function of the standard normal random variable.

4. Data Set and Variables

Our data set comes from the LAKASS baseline survey conducted in the province of Abra by the College of Home Economics and Technology of the Benguet State University between April and June 1990. The information-gathering activity was part of a set of surveys commissioned by the NNC in 1990-1991 to monitor and evaluate the implementation of the LAKASS Program. Twenty-nine state colleges and universities (SCUs) were tapped to collect data on program efficiency and organizational effectiveness in the 115 previously identified NDMs located in the provinces of Abra, Kalinga-Apayao, Camarines Sur, Capiz, Agusan del Norte, Misamis Occidental, and Surigao del Norte. Unfortunately, because the SCUs were allowed to formulate their own survey instruments, different sets of information were collected across the provinces. This lack of consistency in the inter-province baseline information severely limited not only the size of our regression sample, but also our ability to investigate a number of other program implementation issues.

For Abra, the sample originally included the 177 household beneficiaries of the LAKASS Program in the municipalities of Bucay, Penarrubia, and Dolores. Information on (a) socioeconomic characteristics, (b) the weight and degree of malnutrition of the previously identified undernourished child, (c) the type of LAKASS intervention received, and (d) extent of involvement in the LAKASS project were collected from respondents. Fifteen households had to be dropped from the data set, however, because of incomplete information on the variables required by our model. Hence, our regression sample was reduced to the remaining 162 observations.

Table 1 provides some descriptive statistics of the variables used in this study based on the 162 households in our sample. As shown in the table, the types of LAKASS Program interventions in Abra may be classified into three ordered categories: (1) the provision of food assistance to

Table 1 - Descriptive Statistics of Variables

Variable	Standard Description	Mean	Standard Deviation	Minimum	Maximum
LAKASS Program Intervention					
Type 1 Intervention	1 if a recipient of food assistance and participated in mother's class 0 otherwise	0.191	0.395	0	1
Type 2 Intevention	1 if a recipient of Type 1 intervention and participated in animal raising, 0 otherwise	0.407	0.493	0	1
Type 3 Intervention	1 if a recipient of Type 2 intervention and benefitted from potable water system, 0 otherwise	0.401	0.492	0	1
Husband's Age	Age of the husband (in years)	35.358	8.809	19	65
Wife's Age	Age of the wife (in years)	33.160	8.192	19	69
Child's Age	Age of the identified undernourished child (in years)	2.986	2.135	0	12
Husband's Occupation					
Farmer	1 if engaged in farming, 0 otherwise	0.827	0.379	0	1
Fisherman	1 if engaged in fishing, 0 otherwise	0.012	0.111	0	1
Others	1 if not engaged in fishing or farming, 0 otherwise	0.160	0.368	0	1
Wife's Employment Status	1 if employed, 0 otherwise	0.037	0.189	0	1

Table 1 (continued)

Variable	Standard Description	Mean	Standard Deviation	Minimum	Maximum
Number of Children	Number of children in the household	6.346	2.376	2	13
Household Income					
P 1,000 and below	1 if monthly income is P1,000 or less, 0 otherwise	0.556	0.498	0	1
P 1,001 to P 2,500	1 if monthly income is between P1,001 and P2,500, 0 otherwise	0.364	0.483	0	1
P 2,501 to P 5,000	1 if monthly income is between P2,501 and P5,000, 0 otherwise	0.056	0.230	0	1
P 5,001 to P 7,500	1 if monthly income is between P5,001 and P7,500, 0 otherwise	0.012	0.111	0	1
P 7,501 to P10,000	1 if monthly income is between P7,501 and P10,000, 0 otherwise	0.012	0.111	0	1
	Number of Observations 162				

the previously identified undernourished child and nutrition information and education to the mother; (2) in addition to the services provided in (1), the provision of farm animals (*e.g.*, swine, goat, duck, chicken, or cattle) for breeding as an income–augmenting measure; and (3) in addition to (2), the construction of a potable water delivery system. The values of the sample means for the (mutually exclusive) dummy variables that denote whether a respondent household was a recipient of a particular intervention indicate that about 20 percent of the sample households were beneficiaries of the Type 1 intervention, while the rest were roughly evenly divided as recipients of either the Type 2 or Type 3 intervention.

Turning to the demographic and socioeconomic characteristics of the household beneficiaries, it can be inferred from Table 1 that husbands, wives, and the undernourished children are somewhat dispersed in age. Husbands' ages range from 19 to 65 years (with a standard deviation of almost 9 years), those of wives from 19 to 69 years (with a standard deviation of 8 years), and the children's from the newly born to 12 years (with a standard deviation of 2 years). The sample means of the ages suggest, however, that these members of the family tend to be relatively young: the mean age of husbands is 35 years, that of wives 33 years, and that of children just under 3 years. Consistent with the findings of other surveys on poor families, the sizes of the household beneficiaries tend to be moderately large, with 6 as the mean number of children.

An overwhelming majority of the household heads (83 percent) are engaged in farming. The rest are either fishermen or engaged in activities not related to either farming or fishing, *e.g.*, driving or handicraft making. In these households, the burden of having to earn incomes is squarely borne by the husbands. In stark contrast to the proportion of household heads who are engaged in gainful activities, 96 percent of the spouses are either unemployed or not part of the labor force. With more than half of the households reporting monthly incomes of below P1,000, with about a third earning between P1,000 and P2,500 per month, and

with the rest receiving no more than P10,000 monthly, it is painfully clear that the LAKASS beneficiaries in Abra are among the poorest in the country.

5. Estimation Results

Who receives which types of LAKASS interventions in Abra? Our estimation results, which are presented in Table 2, indicate that the type of LAKASS interventions received by beneficiaries can be systematically identified by the ages of the wife and the undernourished child (though not the husband's), by the husband's occupation (though not the employment status of the wife), and by the income class of the household.

Specifically, as shown in Table 3, the marginal effects of these demographic and socioeconomic factors on the probability of a household's receiving a particular combination of LAKASS interventions—evaluated for a hypothetical family with a monthly income of P1,000 or less, whose head is neither a farmer nor a fisherman, and whose household size and members' ages are at the sample means—are as follows:

Table 2 - Ordered Probit Regression of the Socioeconomic Characteristics of LAKASS Beneficiaries

Variables	Coefficient Estimates	Student's t-Statistics
Constant	-0.96988	-0.625
Husband's Age	-0.05288	-0.446
Husband's Age Squared	0.00142	0.906
Wife's Age	0.18223	1.759 *
Wife's Age Squared	-0.00297	-2.151 **
Child's Age	0.83473	4.460 ***
Child's Age Squared	-0.08771	-3.338 ***
Husband's Occupation: Farming	-1.48303	-4.248 ***
Husband's Occupation: Fishing	-1.85522	-1.800 *
Wife's Employment Status	-0.44259	-0.817

Table 2 (continued)

Variables	Coefficient Estimates	Student's t-Statistics
Number of Children	-0.00174	-0.035
Household Income		
P 1,001 to P 2,500	-0.76853	-3.584 ***
P 2,501 to P 5,000	-1.63099	-3.441 ***
P 5,001 to P 7,500	-2.75835	-3.216 ***
P 7,501 to P10,000	-2.59141	-2.682 ***
Threshold Value	1.60706	9.408 ***
Log Likelihood Function	-125.887	
Number of Observations	162	

* significant at 10 percent
** significant at 5 percent
*** significant at 1 percent

Table 3 - Marginal Effects on the Probability of Receiving a Type of LAKASS Intervention

Variables	Type 1 Intervention	Type 2 Intervention	Type 3 Intervention
Wife's Age	0.00002	0.00113	-0.00115
Child's Age	-0.00037	-0.02391	0.02428
Husband's Occupation: Farming	0.02648	0.31142	-0.33790
Husband's Occupation: Fishing	0.05931	0.42850	-0.48417
Household Income			
P 1,001 to P 2,500	0.00377	0.11053	-0.11430
P 2,501 to P 5,000	0.03705	0.35803	-0.39507
P 5,001 to P 7,500	0.25600	0.53808	-0.79408
P 7,501 to P10,000	0.20531	0.54312	-0.74843

The marginal effects of the significant variables are evaluated at the sample means of the number of children and the ages of the husband, wife, and undernourished child for a family whose head is neither engaged in farming nor fishing and whose monthly income is P1,000 or less.

(a) When the spouse of the household head is about 33 years old (the sample means of wives' ages), the likelihood that her family would be a beneficiary of Type 1 or Type 2 aid is increasing, while the likelihood that it would receive Type 3 assistance is decreasing. This result is misleading, however, because the wife's age is found to have a quadratic effect on the household's implicit score, I^*. Looking at the entire range of the spouses' ages (see Figure 1), we see that it is not until the wife is about 56 years old that the probability of her household's receiving Type 3 aid is exceeded by the probability of its receiving Type 2 aid. And it is not until the wife is in her mid-60s that the probability of her family's receiving Type 2 aid is surpassed by the probability of its receiving minimal assistance. This is as well as can be expected, since it is the younger mothers who are less experienced in child care and home management, whose households need more assistance.

(b) At the sample means of the undernourished children's ages (3 years), the likelihood that the family would be a beneficiary of Type 1 or Type 2 aid is decreasing, whereas the likelihood that the family would receive Type 3 aid is increasing. Examining how the probabilities behave over the entire range of undernourished children's ages (please refer to Figure 2), we see that families with an undernourished child younger than 10 years tend to receive Type 3 aid, those with an undernourished child between 10 and 11 years tend to receive Type 2 aid, and those with older children tend to receive minimal aid. Again, this result is as good as can be hoped for, since the nutrition literature on children's growth trajectory (*e.g.*, Martorell *et al.* 1990) indicates that opportunities for catch-up growth diminishes with age.

(c) Households whose heads are engaged in farming or fishing have better chances of being beneficiaries of Type 1 and Type 2 interventions than households

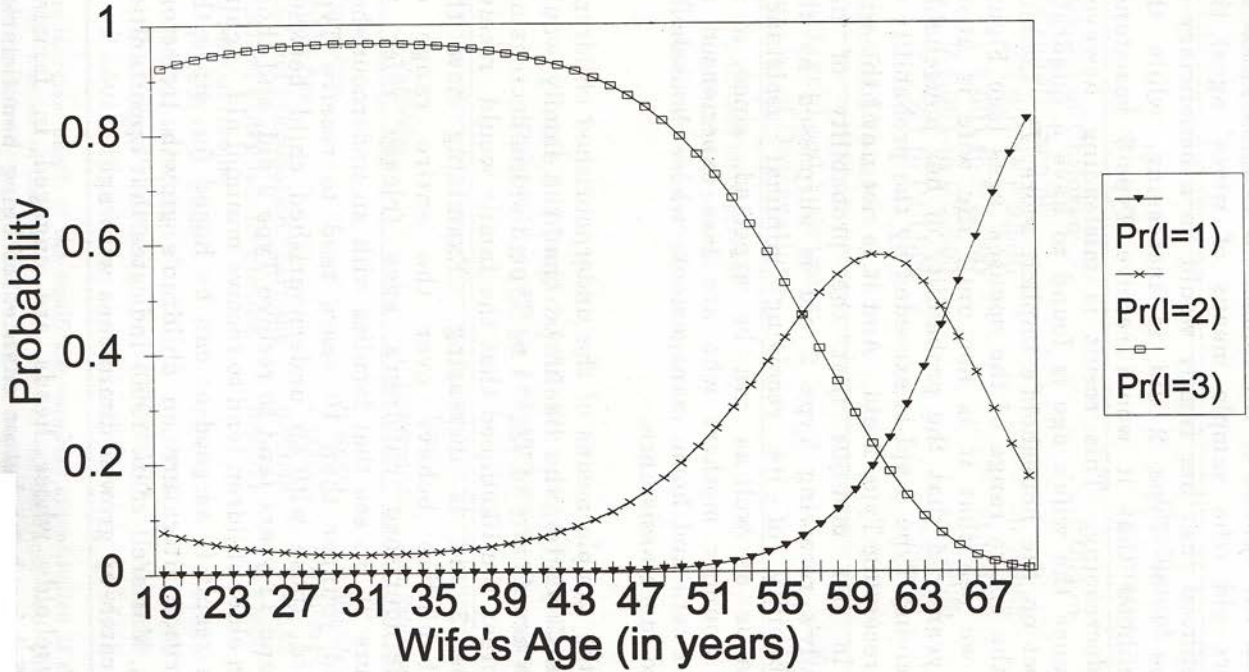

Figure 1
Wife's Age (in years)

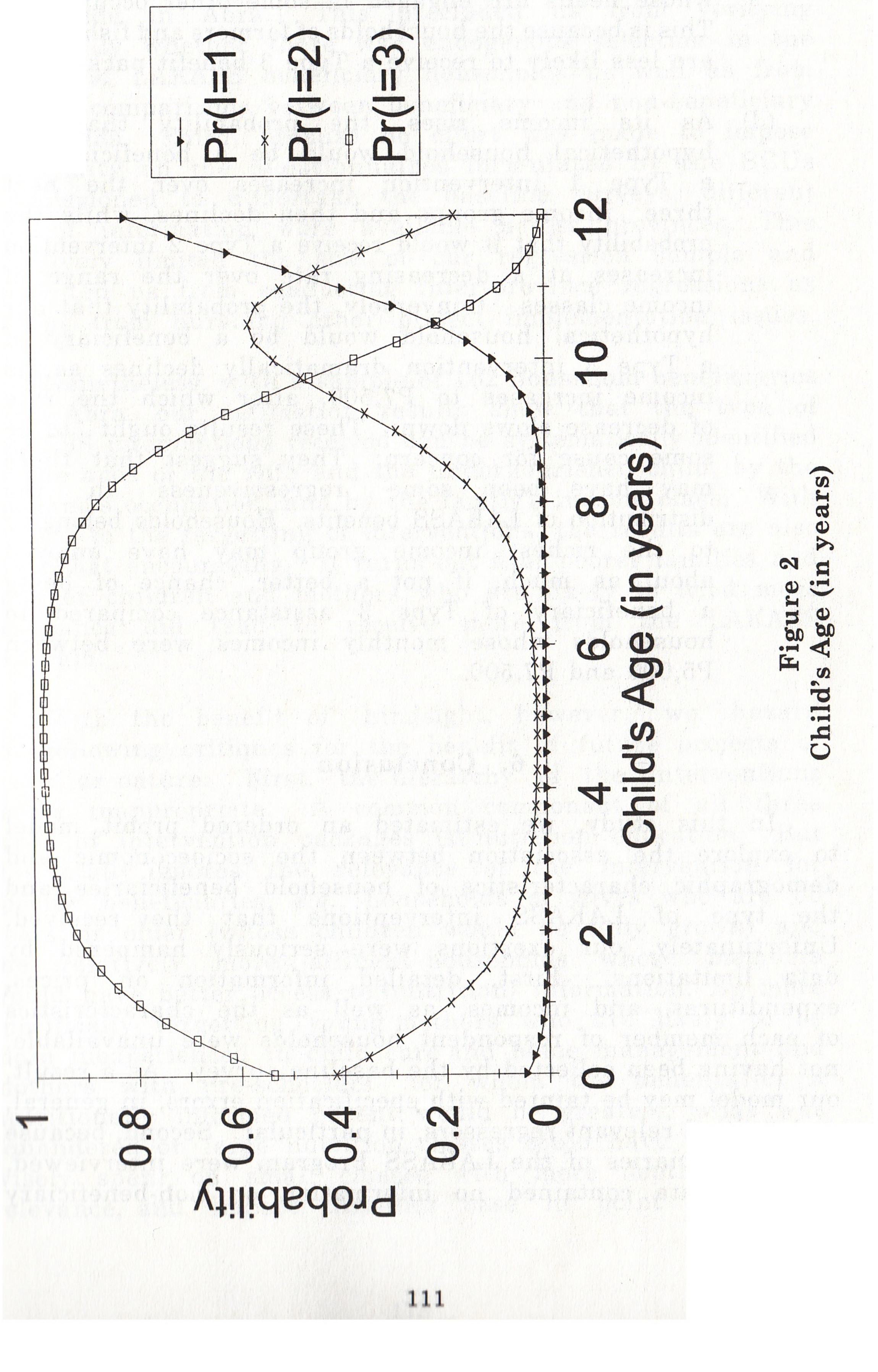

Figure 2
Child's Age (in years)

whose heads are engaged in some other occupation. This is because the households of farmers and fishermen are less likely to receive a Type 3 benefit package.

(d) As its income rises, the probability that our hypothetical household would be a beneficiary of a Type 1 intervention increases over the next three income groups and then declines, while the probability that it would receive a Type 2 intervention increases at a decreasing rate over the range of income classes. Conversely, the probability that our hypothetical household would be a beneficiary of a Type 3 intervention dramatically declines as its income increases to P7,500, after which the rate of decrease slows down. These results ought to be some cause for concern: They suggest that there may have been some regressiveness in the distribution of LAKASS benefits. Households belonging to the richest income group may have enjoyed about as much, if not a better, chance of being a beneficiary of Type 3 assistance compared to households whose monthly incomes were between P5,000 and P7,500.

6. Conclusion

In this study, we estimated an ordered probit model to explore the association between the socioeconomic and demographic characteristics of household beneficiaries and the type of LAKASS interventions that they received. Unfortunately, our exertions were seriously hampered by data limitations. First, detailed information on prices, expenditures, and incomes, as well as the characteristics of each member of respondent households were unavailable, not having been collected by the baseline survey. As a result, our model may be tainted with specification errors, in general, and omitted relevant regressors, in particular. Second, because only beneficiaries of the LAKASS Program were interviewed, baseline data contained no information on non-beneficiary

households in Abra. This precluded us from verifying empirically whether there was endogenous selection in the sample of LAKASS beneficiary households as well as from making comparisons between beneficiary and non-beneficiary households. Third, because no effort was made to impose uniformity on the questionnaires formulated by the SCUs commissioned to undertake the baseline surveys, different sets of information were available across provinces. This effectively limited the size of our regression sample and prevented us from conducting inter-province regressions as well as from pursuing other project implementation issues.

Nonetheless, with a sample of 162 household beneficiaries from Abra, our estimation results show that the type of LAKASS interventions received can be systematically identified by the ages of the wife and the undernourished child, by the husband's occupation, and by the family's income class. With respect to the targetting of interventions, the results are also somewhat encouraging. It turns out that poorer families and younger children and mothers who are likely to need more assistance did tend to receive more from the LAKASS Program.

With the benefit of hindsight, however, we hazard the following critiques for the benefit of future projects of a similar nature: First, the hierarchy of the interventions seems inappropriate. A common component of all three types of intervention packages is nutrition education. But this totally ignores the relevance of the intervention for specific beneficiaries, *e.g.*, households of wives who are 50 years or older (whose children would be fully grown) and the relatively more affluent households whose members would have better access to (nutrition) information. By more specifically targetting young mothers who are likely to be more inexperienced in child care and home management and mothers with pre-schoolers for whom the benefits of a nutritionally informed parent would be greatest, what was squandered on large nutrition classes could have been more wisely spent on small classes with more depth, quality, relevance, and impact. Another case in point is animal

raising, which is distinguishing feature of a Type 2 intervention. As Table 3 shows, the probability of a household's participating in this income-generating form of assistance increases with its income level.

Second, project evaluation should have been planned and undertaken as an integral part of project implementation, not as a post-implementation activity. Ideally, pre-, during, and post-implementation surveys should have been conducted on both beneficiary and non-beneficiary groups with a clear vision of project objectives so that the impact of the project on the welfare of its beneficiaries could be measured. In the absence of such information, it remains to be seen whether the LAKASS Program, as implemented in Abra, led to the improvement in the lives of its intended beneficiaries.

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