Journal of Philippine Development
Number 45, Volume XXV, No. 1, First Semester 1998

Simulating the Impact of Macroeconomic Policy Changes on Macronutrient Availability in Households

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I. INTRODUCTION

A series of macroeconomic policy changes have been implemented in recent years. In a summary of sectoral review studies, Lamberte et al. (1992) highlighted the fact that these policy changes had significant effects on many household decisions such as schooling, health care, food consumption, and labor force participation, among others. It was also pointed out that there appeared to be very little effort at quantifying these impacts using Philippine data. The purpose of this paper is to fill in this gap and to contribute to a better understanding of these effects.

This paper estimates price and income elasticities of demand for food using a nationally-representative sample survey data. These estimates are then utilized to simulate the impact of macroeconomic policy changes on the nutritional status of households. This is implemented by utilizing price and income changes

* Research Fellow, Philippine Institute for Development Studies, and Associate Professor, UP School of Economics. We acknowledge the comments made by participants at the technical workshops organized by MIMAP. Aida Hilario and Eduardo Cruz provided excellent research assistance. The usual disclaimer applies. This research was done with financial support from the Micro Impact of Macroeconomic Adjustment Policies (MIMAP) project of the Policy Development Foundation, Inc. (PDFI) which is funded by the International Development Research Centre. This is a revised version of the paper presented at the Joint Technical Workshop of the MIMAP Project and the PIDS-TRP Project, April 11-12, 1996, Punta Baluarte, Calatagan, Batangas.

generated by simulating the impact of a macroeconomic policy change using a general equilibrium model. The study shows that the traditional results of simulating general equilibrium models, which stop at the impact on income distribution, can be enriched by explicitly dealing with the impact of price and income changes on household decisions.

The paper is organized as follows. The next section deals with the conceptual framework used in the analysis. This is followed by a description of the data set and estimation methods. The fourth section presents conclusions.

II. FRAMEWORK

Food Demand System

The study utilizes the Almost Ideal Demand System (AIDS) (Deaton and Muellbauer 1980). the estimable form of the model is as follows:

$$w_i = \alpha_i + \sum_j \gamma_{ij} \log p_j + \beta_i \log \left(\frac{x}{P} \right) \quad (1)$$

where:

w_i = share of commodity i to total expenditure
p_j = price of commodity item j
x = total expenditure, and
P = price index defined as:

$$\log P = \alpha_o + \Sigma \alpha_k \log p_k + \frac{1}{2} \sum_k \sum_l \gamma_{kl} \log p_k \log p_l \quad (2)$$

but is usually approximated by the Stone (1953) index of the form

$$\log P = \sum w_k \log p_k. \quad (3)$$

The adding up restrictions are

$$\sum_i \alpha_i = 1 \quad \sum_i \gamma_{ij} = 0 \quad \sum_i \beta_i = 0$$

while the homogeneity of degree zero in prices and symmetry restrictions are, respectively,

$$\sum_j \gamma_{ij} = 0$$

and

$$\gamma_{ij} = \gamma_{ji}.$$

This model has been extended in several ways. For example, Blundell et al. (1993) introduced a $(x/P)^2$ term calling the resulting model Quadratic AIDS or QAIDS. In addition, it was also argued in the paper that α and β may be affected by household characteristics. Understandably, the parameter γ is left alone; otherwise nonlinearities will be introduced into the model.

Considering that the data used come from a national survey, the study adopts the hypothesis that α and β are affected by household characteristics. However, we did not find it necessary to include squared term.[1] Thus, the equation estimated is

$$w_i = \alpha_i + \sum_j \gamma_{ij} \log p_j + \beta \log \left(\frac{x}{P} \right) + \sum \delta_k Z_k \qquad (4)$$

where

Z_k = household characteristics.

It should be noted that there are other systems of demand equations used for estimating price and income elasticities for food. Bouis (1991), for instance, estimated a food demand model based on the demand for characteristics. Quisumbing (1985), on the other hand, used several methods to estimate food demand elasticities, viz., single-equation double-log method, system of equation double-log method using seemingly unrelated regression (SURE), S-branch model or almost complete system, and the indirect Frisch method. SURE estimates were used in the simulations because they exhibited a stable behavior across income groupings. The results of many of the previous studies are presented in the latter part of the paper.

1. The importance of the coefficient of income and the squared term in policy analysis has been the subject of a lengthy but largely unresolved debate. See Alderman (1993) for a recent review of the debate.

The uncompensated price elasticities of the AIDS model are as follows:

$$\epsilon_{ij} = (\frac{\gamma_{ij}}{w_i}) k_{ij} \quad (5)$$

where $k_{ij} = 1$ if $i = j$ and 0 if $i \neq j$. Expenditure elasticities, on the other hand, are as follows:

$$\eta_i = (\frac{\beta_i}{w_i}) + 1. \quad (6)$$

Simulating the Nutrition Effects of Price and Income Changes

Lamberte, Llanto and Orbeta (1992) pointed out that changes in prices of outputs and inputs, as well as changes in the provision of public services, are the primary transmission mechanisms with which the effects of a macroeconomic policy change reach households. Any macroeconomic policy change can be translated into price and income changes using either a general equilibrium model, a sufficiently disaggregated macroeconometric model, or a multimarket model. One can then use the resulting price and income changes to estimate changes in demand for food or nutrients of interest given estimates of price and income elasticities.

Quisumbing (1985) illustrates one method of analysis. A multimarket model was presented consisting of supply, demand and equilibrium relations for different food items. Policy instruments such as supply shifters, demand shifters and price wedges were introduced into the system. The system was then used to simulate the impact of food sector policies on food demand. The changes in the demand for food were then translated into changes in calorie and protein consumption using a calorie and protein contribution table. The model was then used to simulate the effects of food policies on calorie and protein consumption of households. Quisumbing, however, pointed out that, for more general macroeconomic policies, a general equilibrium model or a sufficiently disaggregated macroeconometric model will be needed.

Formally, the demand for food can be expressed in percentage terms as follows:

$$\hat{q}_i = \sum_j \epsilon_{ij} \hat{p}_j + \eta_{ij} \hat{x} \quad (7)$$

where $\hat{y}$ indicates percentage change of y. This expression implies the reasonable assumption that other household characteristics are presumed not to be affected by policy changes. Given equilibrium percentage changes in prices and incomes due to any policy change, one can compute the percentage changes in quantity demanded. One can then use the average contribution of each food item to specific nutrients of interest to derive the implications of macroeconomic policy changes on nutrient consumption of households using the relation

$$\hat{N} = \sum_i K_i \hat{q}_i \tag{8}$$

where K_i is the initial nutrient contribution of commodity i.

Alternatively, one can estimate nutrient price and income elasticities from price and income elasticity estimates for food. This is what Sahn (1988) did using data from Sri Lanka. Calorie price and income elasticities are postulated to be a weighted average of food demand elasticities using calorie contents as weights. Formally, income elasticities of demand for calories were computed as

$$M_c = \frac{\sum_i C_i q_i \eta_i}{\sum_i C_i q_i} \tag{9}$$

and the nutrient price elasticities with respect to commodity i as

$$E_{ci} = \in_{ii} k_i + \sum_j \in_{ji} k_j \tag{10}$$

where

C_i = per unit nutrient content of commodity i
q_i = quantity consumed of commodity i
η_i = income elasticity of demand for commodity i
$\in_{ii}$ = own-price elasticity for commodity i
$\in_{ji}$ = cross-price elasticity for commodity i
k_i = share of total nutrients from commodity i.

To calculate the change in nutrient consumption resulting from changes in price and income, the following relation was used:

$$\hat{N} = M_c\hat{y} + E_{ci}\hat{p}_i \qquad (11)$$

This study will use the Quisumbing methodology in the simulations.

A clarification as to what $\hat{N}$ is being computed by the framework presented is in order. $\hat{N}$ in equation (8) is the percentage change in nutrient availability (not nutrient intake) given changes in prices of food and incomes of households. This is because $\hat{q}$, as a measure of changes in consumption demand, accounts for what was available in the household and not necessarily what was actually consumed.

III. DATA AND ESTIMATION

The study used food expenditure data from the *1991 Family Income and Expenditure Survey* (FIES) and the provincial price indices from the National Statistics Office. The two data sets provide information on seven food items, namely, cereals, fruit, meat, dairy and eggs, fish, beverage and a "catch-all" food commodity called others and also nonfood expenditures. The expenditure shares of each food item by income quintile are given in Table I. The six food items constitute 79 to 87 percent of total food expenditures (Table 1). It can be argued that this level of disaggregation is too lumpy to be useful for nutrition simulation. This argument, however, can only be validated empirically. Unfortunately, data that will allow further disaggregation are not readily available.

The household characteristics used include the characteristics of the household head such as age and education, age composition of household members, and regional dummy variables. The study disaggregated the households into income quintiles based on per capita income. Table 2 shows the descriptive statistics of the variables used in the estimation.

To simplify econometric estimation, the observations with zero expenditures on any of these food items were removed from the sample. If one includes these observations in the sample an econometric technique that handles truncation bias, i.e, tobit,

will be needed. Table 3 shows the extent of this problem. Only in three instances did occurrence of zero expenditures exceed 10 percent, and all of these instances involved the lowest income quintile. These are in meat, dairy and eggs and beverage food items. Thus, the authors did not find the problem pervasive enough to warrant special econometric estimation technique.

The AIDS model (equation 4) can be estimated using single-equation techniques, i.e., ordinary least squares. However, if one imposes cross-equation restrictions such as symmetry, a system estimator is required. The preferred system estimation technique for demand systems is the seemingly unrelated regression (SURE) method. Barten (1969) showed that this model has a singular variance-covariance matrix. Thus, system estimation will only be possible if one equation is dropped. However, if an equation is dropped from the system, SURE estimates will not be invariant to the equation omitted. One requires a maximum likelihood estimator to overcome this problem. Considering that this procedure is fairly difficult to implement, iterative SURE estimation which converges to the maximum likelihood estimates is com-

TABLE 1
Expenditure Shares by Commodity, by Income Quintile, 1991 FIES (In percent)

	QUINTILE				
	1	2	3	4	5
Food	0.67093	0.62589	0.57980	0.52404	0.42214
Cereal	0.31852	0.24978	0.19987	0.14736	0.08981
Fruit & Veg.	0.05944	0.05696	0.05395	0.04942	0.04168
Meat	0.04297	0.05392	0.06535	0.07719	0.08290
Dairy & Eggs	0.02965	0.03680	0.03977	0.04174	0.03705
Fish	0.10962	0.10740	0.09442	0.07697	0.05341
Beverage	0.02392	0.02932	0.03181	0.03203	0.02720
Others	0.08681	0.09172	0.09464	0.09932	0.09009
Nonfood	0.32907	0.37411	0.42020	0.47596	0.57786

TABLE 2A
Descriptive Statistics of the Variables, Quintile 1

Variable	Description	Mean	Std Dev	Minimum	Maximum
CRL-LOG	Log price of cereal	0.0672	0.0663	-0.1022	0.2350
FRUT-LOG	Log price of fruits and vegetables	0.1229	0.1574	-0.1492	0.5559
MEAT-LOG	Log price of meat	-0.0375	0.0754	-0.2340	0.2214
DAEG-LOG	Log price of dairy products and eggs	-0.0029	0.0885	-0.1871	0.1610
FISH-LOG	Log price of fish	-0.0188	0.1178	-0.2945	0.3254
BEV-LOG	Log price of beverages	-0.0143	0.1077	-0.3323	0.3047
OTHE-LOG	Log price of other food items	-0.3916	0.5025	-8.2144	1.9249
NFOD-LOG	Log price of nonfood items	-0.1334	0.1608	-1.6716	0.7576
Y	Log of real income	8.1275	0.3486	6.5074	9.9458
MEM0-6	Proportion of members aged 0-6 to total household members	0.2090	0.1780	0	0.7500
MEM7-14	Proportion of members aged 7-14 to total household members	0.0256	0.1821	0	0.8333
HH-EDGR	1 if household head attended grade school, 0 otherwise	0.9054	0.2926	0	1
HH-EDHI	1 if household head attended high school, 0 otherwise	0.2213	0.4152	0	1
HH-EDCO	1 if household head attended college, 0 otherwise	0.0268	0.1615	0	1
HH-AGE	Age of household head (in years)	43.9385	13.1566	15	91
REG 1	1 if household belongs to Region 1, 0 otherwise	0.0502	0.2184	0	1
REG 2	1 if household belongs to Region 2, 0 otherwise	0.0367	0.1880	0	1
REG 3	1 if household belongs to Region 3, 0 otherwise	0.0416	0.1998	0	1
REG 4	1 if household belongs to Region 4, 0 otherwise	0.0819	0.2743	0	1
REG 5	1 if household belongs to Region 5, 0 otherwise	0.1085	0.3111	0	1

TABLE 2A (CONTINUED)

Variable	Description	Mean	Std Dev	Minimum	Maximum
REG 6	1 if household belongs to Region 6, 0 otherwise	0.1027	0.3035	0	1
REG 7	1 if household belongs to Region 7, 0 otherwise	0.1229	0.3284	0	1
REG 8	1 if household belongs to Region 8, 0 otherwise	0.0896	0.2856	0	1
REG 9	1 if household belongs to Region 9, 0 otherwise	0.0594	0.2365	0	1
REG 10	1 if household belongs toRegion 10, 0 otherwise	0.1076	0.3099	0	1
REG 11	1 if household belongs toRegion 10, 0 otherwise	0.0941	0.2920	0	1
REG 12	1 if household belongs to Region 12, 0 otherwise	0.0459	0.2093	0	1
REG 13	1 if household belongs to the Cordillera Administrative Region, 0 otherwise	0.0236	0.1519	0	1
REG14	1 if household belongs to the Autonomous Region of Muslim Mindanao, 0 otherwise	0.0290	0.1679	0	1

Number of observations =3101.

TABLE 2B
Descriptive Statistics of the Variables, Quintile 2

Variable	Description	Mean	Std Dev	Minimum	Maximum
CRL-LOG	Log price of cereal	0.0701	0.0729	-0.1022	0.3963
FRUT-LOG	Log price of fruits end vegetables	0.1223	0.1488	-0.1492	0.5559
MEAT-LOG	Log price of meat	-0.0288	0.0749	-0.2340	0.2214
DAEG-LOG	Log price of dairy products and eggs	-0.0020	0.0806	-0.1871	0.1610
FISH-LOG	Log price of fish	-0.0054	0.1203	-0.2945	0.3254
BEV-LOG	Log price of beverages	-0.0048	0.1069	-0.3323	0.3047
OTHE-LOG	Log price of other food items	-0.2790	0.4014	-6.0290	1.1805
NFOD-LOG	Log price of nonfood items	-0.1012	0.1481	-4.0935	0.3561
Y	Log of real income	8.5577	0.2880	6.8892	10.1086
MEM0-6	Proportion of members aged 0-6 to total household members	0.1665	0.1820	0	0.7500
MEM7-14	Proportion of members aged7-14 to total household members	0.2167	0.1920	0	0.8000
HH-EDGR	1 if household head attended grade school, 0 otherwise	0.9327	0.2506	0	1
HH-EDHI	1 if household head attended high school, 0 otherwise	0.3104	0.4627	0	1
HH-EDCO	1 if household head attended college, 0 otherwise	0.0506	0.2193	0	1
HH-AGE	Age of household head (in years)	45.6418	14.0804	16	98
REG 1	1 if household belongs to Region 1, 0 otherwise	0.0680	0.2517	0	1
REG 2	1 if household belongs to Region 2, 0 otherwise	0.0472	0.2121	0	1
REG 3	1 if household belongs to Region 3, 0 otherwise	0.0874	0.2825	0	1
REG 4	1 if household belongs to Region 4, 0 otherwise	0.1275	0.3336	0	1

TABLE 2B (CONTINUED)

Variable	Description	Mean	Std Dev	Minimum	Maximum
REG 5	1 if household belongs to Region 5, 0 otherwise	0.0823	0.2748	0	1
REG 6	1 if household belongs to Region 6, 0 otherwise	0.1100	0.3129	0	1
REG 7	1 if household belongs to Region 7, 0 otherwise	0.0933	0.2909	0	1
REG 8	1 if household belongs to Region 8, 0 otherwise	0.0587	0.2350	0	1
REG 9	1 if household belongs to Region 9, 0 otherwise	0.0474	0.2125	0	1
REG 10	1 if household belongs to Region 10, 0 otherwise	0.0680	0.2517	0	1
REG 11	1 if household belongs to Region 11, 0 otherwise	0.0851	0.2790	0	1
REG 12	1 if household belongs to Region 12, 0 otherwise	0.0344	0.1823	0	1
REG 13	1 if household belongs to the Cordillera Administrative Region, 0 otherwise	0.0173	0.1305	0	1
REG 14	1 if household belongs to the Autonomous Region of Muslim Mindanao, 0 otherwise	0.0372	0.1893	0	1

Number of observations=3851.

TABLE 2C
Descriptive Statistics of the Variables, Quintile 3

Variable	Description	Mean	Std Dev	Minimum	Maximum
CRL-LOG	Log price of cereal	0.0705	0.0761	-0.1022	0.3963
FRUT-LOG	Log price of fruits and vegetables	0.1095	0.1384	-0.1492	0.5559
MEAT-LOG	Log price of meat	-0.0237	0.0688	-0.2340	0.2214
DAEG-LOG	Log price of dairy products and eggs	-0.0028	0.0743	-0.1871	0.1610
FISH-LOG	Log price of fish	-0.0051	0.1128	-0.2945	0.3254
BEV-LOG	Log price of beverages	0.0009	0.1016	-0.3323	0.3047
OTHE-LOG	Log price of other food items	-0.2119	0.3529	-6.2430	0.7481
NFOD-LOG	Log price of nonfood items	-0.0771	0.1208	-1.2146	0.3489
Y	Log of real income	8.9097	0.2929	7.5928	10.6651
MEM0-6	Proportion of members aged 0-6 to total household members	0.1407	0.1750	0	0.8000
MEM7-14	Proportion of members aged 7-14 to total household members	0.1842	0.1881	0	0.8000
HH-EDGR	1 if household head attended grade school, 0 otherwise	0.9439	0.2302	0	1
HH-EDHI	1 if household head attended high school, 0 otherwise	0.4280	0.4948	0	1
HH-EDCO	1 if household head attended college, 0 otherwise	0.1041	0.3054	0	1
HH-AGE	Age of household head (in years)	46.2406	14.1763	15	98
REG1	1 if household belongs to Region 1, 0 otherwise	0.0622	0.2416	0	1
REG2	1 if household belongs to Region 2, 0 otherwise	0.0433	0.2035	0	1
REG3	1 if household belongs to Region 3, 0 otherwise	0.1220	0.3274	0	1
REG4	1 if household belongs to Region 4, 0 ctherwise	0.1592	0.3659	0	1
REG5	1 if household belongs to Region5, 0 ctherwise	0.0518	0.2217	0	1

TABLE 2C (CONTINUED)

Variable	Description	Mean	Std Dev	Minimum	Maximum
REG 6	1 if household belongs to Region 6, 0 otherwise	0.0920	0.2891	0	1
REG 7	1 if household belongs to Region 7, 0 otherwise	0.0696	0.2545	0	1
REG 8	1 if household belongs to Region 8, 0 otherwise	0.0480	0.2137	0	1
REG 9	1 if household belongs to Region 9, 0 otherwise	0.0439	0.2048	0	1
REG 10	1 if household belongs to Region 10, 0 otherwise	0.0531	0.2242	0	1
REG 11	1 if household belongs to Region 11, 0 otherwise	0.0710	0.2569	0	1
REG 12	1 if household belongs to Region 12, 0 otherwise	0.0278	0.1643	0	1
REG 13	1 if household belongs to the Cordillera Administrative Region, 0 otherwise	0.0169	0.1291	0	1
REG 14	1 if household belongs to the Autonomous Region of Muslim Mindanao, 0 otherwise	0.0337	0.1804	0	1

Number of observations = 4449.

TABLE 2D
Descriptive Statistics of the Variables, Quintile 4

Variable	Description	Mean	Std Dev	Minimum	Maximum
CRL-LOG	Log price of cereal	0.0665	0.0765	-0.1022	0.3963
FRUT-LOG	Log price of fruits and vegetables	0.0919	0.1259	-0.1492	0.5559
MEAT-LOG	Log price of meat	-0.0193	0.0616	-0.2340	0.2214
DAEG-LOG	Log price of dairy products and eggs	-0.0025	0.0675	-0.1871	0.1610
FISH-LOG	Log price of fish	0.0006	0.1034	-0.2945	0.3254
BEV-LOG	Log price of beverages	0.0085	0.0962	-0.3323	0.3047
OTHE-LOG	Log price of other food items	-0.1462	0.2952	-5.2044	0.5265
NFOD-LOG	Log price of nonfood items	-0.0526	0.1032	-0.9795	1.0869
Y	Log of real income	9.3080	0.3309	7.5698	11.4239
MEM0-6	Proportion of members aged 0-6 to total household members	0.1226	0.1684	0	0.7500
MEM7-14	Proportion of members aged 7-14 to total household members	0.1659	0.1876	0	0.8333
HH-EDGR	1 if household head attended grace school, 0 otherwise	0.9642	0.1859	0	1
HH-EDHI	1 if household head attended high school, 0 otherwise	0.5652	0.4958	0	1
HH-EDCO	1 if household head attended college, 0 otherwise	0.2118	0.4086	0	1
HH-AGE	Age of household head (in years)	47.4974	14.3645	15	96
REG 1	1 if household belongs to Region 1, 0 otherwise	0.0560	0.2300	0	1
REG 2	1 if household belongs to Region 2, 0 otherwise	0.0366	0.1878	0	1
REG 3	1 if household belongs to Region 3, 0 otherwise	0.1438	0.3510	0	1
REG 4	1 if household belongs to Region 4, 0 otherwise	0.1668	0.3728	0	1
REG 5	1 if household belongs to Region 5, 0 otherwise	0.0343	0.1820	0	1

TABLE 2D (CONTINUED)

Variable	Description	Mean	Std Dev	Minimum	Maximum
REG 6	1 if household belongs to Region 6, 0 otherwise	0.0641	0.2450	0	1
REG 7	1 if household belongs to Region 7, 0 otherwise	0.0582	0.2341	0	1
REG 8	1 if household belongs to Region 8, 0 otherwise	0.0272	0.1625	0	1
REG 9	1 if household belongs to Region 9, 0 otherwise	0.0275	0.1637	0	1
REG 10	1 if household belongs to Region 10, 0 otherwise	0.0427	0.2023	0	1
REG 11	1 if household belongs to Region 11, 0 otherwise	0.0612	0.2398	0	1
REG 12	1 if household belongs to Region 12, 0 otherwise	0.0169	0.1291	0	1
REG 13	1 if household belongs to the Cordillera Administrative Region, 0 otherwise	0.0229	0.1496	0	1
REG 14	1 if household belongs to the Autonomous Region of Muslim Mindanao, 0 otherwise	0.0254	0.1574	0	1

Number of observations = 4943.

TABLE 2E
Descriptive Statistics of the Variables, Quintile 5

Variable	Description	Mean	Std Dev	Minimum	Maximum
CRL-LOG	Log price of cereal	0.0554	0.0704	-0.1022	0.3963
FRUT-LOG	Log price of fruits end vegetables	0.0695	0.1089	-0.1492	0.5559
MEAT-LOG	Log price of meet	-0.0142	0.0513	-0.2340	0.2214
DAEG-LOG	Log price of dairy products and eggs	-0.0034	0.0564	-O.1871	O.1610
FISH-LOG	Log price of fish	0.0029	0.0893	-0.2945	0.3254
BEV-LOG	Log price of beverages	0.0063	0.0851	-0.3323	0.3047
OTHE-LOG	Log price of other food items	-0.0800	0.2277	-5.2191	0.9293
NFOD-LOG	Log price of nonfood items	-0.0303	0.0813	-0.6833	0.2455
Y	Log of real income	10.0581	0.5989	8.1353	14.3273
MEM0-6	Proportion of members aged 0-6 to total household members	0.0925	0.1523	0	1
MEM7-14	Proportion of members aged 7-14 to total household members	0.1295	0.0179	0	1
HH-EDGR	1 if household head attended grade school, 0 otherwise	0.9863	0.1164	0	1
HH-EDHI	1 if household head attended high school, 0 otherwise	0.7666	0.4230	0	1
HH-EDCO	1 if household head attended college, 0 otherwise	0.4856	0.4998	0	1
HH-AGE	Age of household head (in years)	48.4631	14.2878	15	98
REG 1	1 if household belongs to Region 1, 0 otherwise	0.0387	0.1928	0	1
REG 2	1 if household belongs to Region 2, 0 otherwise	0.0322	0.1764	0	1
REG 3	1 if household belongs to Region 3, 0 otherwise	0.1310	0.3374	0	1
REG 4	1 if household belongs to Region 4, 0 otherwise	0.1666	0.3726	0	1
REG 5	1 if household belongs to Region 5, 0 otherwise	0.0219	0.1462	0	1

TABLE 2E (CONTINUED)

Variable	Description	Mean	Std Dev	Minimum	Maximum
REG 6	1 if household belongs to Region 6, 0 otherwise	0.0490	0.2158	0	1
REG 7	1 if household belongs to Region 7, 0 otherwise	0.0435	0.2041	0	1
REG 8	1 if household belongs to Region 8, 0 otherwise	0.0173	0.1306	0	1
REG 9	1 if household belongs to Region 9, 0 otherwise	0.0161	0.1258	0	1
REG 10	1 if household belongs to Region 10, 0 otherwise	0.0240	0.1532	0	1
REG 11	1 if household belongs to Region 11, 0 otherwise	0.0448	0.2069	0	1
REG 12	1 if household belongs to Region 12, 0 otherwise	0.0116	0.1069	0	1
REG 13	1 if household belongs to the Cordillera Administrative Region, 0 otherwise	0.0208	0.1426	0	1
REG 14	1 if household belongs to the Autonomous Region of Muslim Mindanao, 0 otherwise	0.0083	0.0908	0	1

Number of observations = 5394.

monly used (Johnston 1984). This is the estimation technique used in the study. The omitted item is the nonfood category.

The complete set of restrictions was applied to the system, namely: homogeneity of degree zero in prices, symmetry and adding-up. Parameters for the omitted item were estimated using the adding-up restriction.

Tables 4 and 5 present the average contribution of each food item to calorie and protein consumption of households. This was derived from the 1993 FNRI food consumption survey (Florentino et al. 1996).

IV. RESULTS

Estimation Results

Table 6 presents the estimation results. Most of the coefficients are statistically significant. Only one coefficient appears to be clearly unexpected. This is the coefficient of the price of fish in the meat equation for the lowest income quintile. One would expect these two goods to be substitutes but the coefficient indicates that they are complements as attested to by the computed elasticities.

Some general trends can be observed from the estimation results. In terms of the impact of household characteristics on food demand, the presence of small children under six years of age consistently increases the share of dairy and eggs, as expected. In the case of education, the significant coefficients indicate positive effects for meat, dairy and eggs, and negative effects for fish. Meat and dairy and eggs consumption is generally higher in the national capital region (the omitted category) than in other regions.

Table 7 presents the uncompensated price and income elasticities computed from the parameter estimates using equations (5) and (6). Own-price elasticities are negative. Meat is price elastic for all income quintiles. In addition, the responsiveness of the demand for meat to price changes is higher for lower-income groups as expected. Dairy and eggs are price elastic for the second, third and fourth quintiles. Fish, on the other hand, is price elastic for the first quintile only. The price substitutability

TABLE 3
Frequency Distribution of Zero and Nonzero Consumption by Commodity, by Income Quintile
(In percent)

Quintile	Cereal		Fruit & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Nonfood	
	zero	non-zero	zero	non-zero	zero	non-zero	zero	non-zero	zero	non-zero	zero	non-zero	zero	non-zero	zero	non-zero
1	0.05	99.95	0.34	99.66	10.00	90.00	17.49	82.51	0.27	99.73	14.05	85.95	0.02	99.98	0.00	100.00
2	0.00	100.00	0.15	99.85	5.26	94.74	9.39	90.16	0.17	99.83	5.82	94.18	0.02	99.98	0.00	100.00
3	0.06	99.94	0.22	99.78	2.96	97.04	4.86	95.14	0.22	99.78	2.78	97.22	0.00	100.00	0.00	100.00
4	0.00	100.00	0.19	99.81	1.62	98.38	2.31	97.69	0.31	99.69	1.21	98.79	0.02	99.98	0.00	100.00
5	0.25	99.75	0.38	99.62	1.05	98.95	1.16	98.84	0.74	99.26	0.56	99.44	0.00	100.00	0.00	100.00

TABLE 4
Energy Contribution by Food Group, by Income Quintile
1993 Food Consumption Survey, FNRI
(In percent)

Food Group	Quintile				
	1	2	3	4	5
Cereals	77.60	75.45	75.00	73.45	71.45
Fruits & Veg.	4.75	4.90	4.55	4.50	4.75
Meat	2.55	3.35	3.95	4.90	5.25
Dairy & Eggs	0.90	1.30	1.65	2.05	2.40
Fish	3.60	3.85	3.75	3.85	3.95
Beverages	4.10	4.45	4.45	4.65	5.25
Other Food	6.45	6.65	6.55	6.60	6.95

Source of Basic Data: FNRI, 1996.

TABLE 5
Protein Contribution by Food Group, by Income Quintile
1993 Food Consumption Survey, FNRI
(In percent)

Food Group	Quintile				
	1	2	3	4	5
Cereals	60.05	56.65	55.80	53.95	51.95
Fruits & Veg.	7.35	7.35	6.90	6.35	6.50
Meat	5.65	7.10	8.50	10.65	11.45
Dairy & Eggs	1.90	2.65	3.60	4.25	4.75
Fish	23.05	24.40	23.55	23.15	23.50
Beverages	0.65	0.65	0.75	0.80	0.75
Other Food	1.30	1.15	0.90	0.85	0.95

Source of Basic Data: FNRI, 1996.

TABLE 6A
Estimation Results, Quintile 1

Variable	Cereal		Fruits & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Nonfood*	
	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0
INTERCEP	1.06215	23.971	0.06252	3.299	-0.08517	4.911	-0.02165	-1.439	0.03118	1.022	-0.04720	-5.183	0.22415	10.126	-0.22597	-0.604
CRL-LOG	0.14780	5.907	-0.01633	-1.900	0.04591	3.974	-0.00801	-0.832	0.04231	3.571	-0.01344	-2.228	-0.05457	-17.804	-0.14367	-2.345
FRUT-LOG	-0.01633	-1.900	0.02305	-0.209	0.00482	1.015	0.00640	1.547	-0.00404	-0.758	0.00297	1.121	-0.01033	-7.781	4.00654	-0.551
MEAT-LOG	0.04591	3.974	0.00482	1.015	-0.03865	-3.584	-0.01191	-1.746	-0.00418	-0.708	0.01686	3.681	0.00534	4.212	-0.01818	-0.756
DAEG-LOG	-0.00801	-0.832	0.00640	1.547	-0.01191	-1.746	0.01997	2.420	0.00082	0.160	-0.00241	-0.586	0.00473	4.325	-0.00959	-0.986
F/SH-LOG	0.04231	3.571	-0.00404	-0.758	-0.00418	-0.708	0.00082	0.160	-0.00339	-0.337	-0.00358	-1.103	0.01337	6.376	-0.04132	-2.589
BEV-LOG	-0.01344	-2.228	0.00297	1.121	0.01686	3.681	-0.00241	-0.586	-0.00358	-1.103	-0.00065	-0.165	0.00496	7.394	-0.00471	-0.549
OTHE-LOG	-0.05457	-17.804	-0.01033	-7.781	0.00534	-4.212	0.00473	4.325	0.01337	6.376	0.00496	7.394	0.03529	22.622	0.00121	0.047
NFOD-LOG	-0.14367	-14.239	-0.00654	-1.584	4.01818	-0.437	-0.00959	-2.691	-0.04132	-6.403	-0.00470	-2.169	0.00121	0.428	0.22279	4.698
Y	-0.10239	-22.132	0.00062	0.311	0.01837	10.135	0.00866	5.508	0.00607	1.904	0.00864	9.075	-0.01230	-5.323	0.07234	1.876
MEM0-6	-0.03707	-0.538	0.00305	0.681	0.01051	2.565	0.02794	7.861	0.01179	1.631	0.00304	1.415	-0.01371	-2.613	-0.00555	0.287
MEM7-14	0.03577	-0.081	-0.01081	-2.882	0.00121	0.354	-0.00696	-2.341	-0.00235	-0.389	-0.00149	-0.826	-0.00739	-1.683	-0.00800	-0.546
HH-EDGR	-0.00029	-0.048	-0.00632	-2.451	-0.00210	-0.891	-0.00139	-0.679	0.00699	1.681	0.00269	2.174	-0.00700	-2.318	0.00742	1.638
HH EDHI	-0.01022	-2.984	-0.00082	-0.558	0.00410	3.065	0.00590	5.084	-0.00445	-1.884	0.00224	3.192	-0.00072	-0.418	0.00396	0.781
HH-EDCO	-0.00509	-0.622	-0.00296	-0.843	0.00412	1.285	0.00250	0.900	-0.00930	-1.646	0.00153	0.911	-0.00468	-1.139	0.01388	3.091
REG1	0.06996	4.066	-0.00433	-0.586	-0.01714	-2.536	-0.01999	-3.410	-0.00827	-0.697	0.00332	0.931	-0.00978	-1.140	-0.01377	-0.480
REG2	0.01437	0.795	0.01697	2.150	-0.00593	-0.822	-0.02545	4.069	-0.00713	-0.573	0.00183	0.481	0.01187	1.335	-0.00653	-0.468
REG3	0.00268	0.151	0.00420	0.558	-0.00778	-1 123	-0.01085	-1.809	0.00241	-0.199	0.00222	.0.612	0.01235	1.415	-0.00041	-0.057
REG4	0.03452	1.996	-0.00675	-0.919	-0.03797	-5.577	-0.02105	-3.565	0.02297	1.944	0.00047	0.131	0.00701	0.824	0.00081	0.035
REG5	0.03435	2.025	0.00083	0.114	-0.03039	4.548	-0.01631	-2.813	0.03198	2.739	-0.00133	-0.377	0.00563	0.666	-0.02475	1.133

TABLE 6A (CONTINUED)

Variable	Cereal		Fruits & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Nonfood*	
	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0
REG6	0.05850	3.433	-0.01673	-2.296	-0.03956	-5.875	-0.02119	-3.634	0.02557	2.183	0.00500	1.416	-0.00831	-0.985	-0.00327	-0.108
[illegible]	0.04178	2.396	-0.01366	-1.834	-0.02891	4.126	-0.02601	4.338	0.04631	3.877	0.00322	0.881	0.00264	0.307	-0.02537	-0.904
	0.03857	2.215	-0.00973	-1.311	-0.01865	-2.737	-0.02193	-3.707	0.02796	2.338	-0.00244	-0.682	0.00176	0.205	-0.01554	-0.731
	0.06010	3.411	0.00373	0.493	-0.03595	-5.145	-0.02497	4.139	0.03420	2.820	-0.00405	-1.106	-0.01369	-1.567	-0.01938	-0.619
)	0.06562	3.835	-0.00339	-0.466	-0.03530	-5.265	-0.02559	4.407	0.01765	1.503	-0.00461	-1.309	-0.00244	-0.288	-0.01193	-0.390
l	0.04784	2.778	0.00539	0.738	-0.03457	4.507	-0.02153	-3.679	0.02604	2.214	0.00016	0.045	0.00668	0.789	-0.03441	-1.377
2	0.06115	3.472	-0.00337	4.448	-0.02345	-3.366	-0.02444	4.056	0.01868	1.543	0.00014	0.038	-0.00444	-0.508	-0.02426	-0.892
3	0.02811	1.466	-0.01135	-1.389	-0.00882	-1.167	-0.01698	-2.604	-0.02659	-2.023	0.00179	0.453	0.00990	1.046	0.02393	1.412
4	0.02973	1.521	-0.02669	-3.161	-0.04758	-6.125	-0.02733	4.050	-0.00505	-0.376	0.01885	4.588	0.02115	2.180	0.03693	1.350
GE	0.00009	0.652	-0.00004	-0.695	-0.00003	-0.491	-0.00007	-1.425	-0.00002	-0.251	-0.00003	-1.168	-0.00013	-1.954	0.00023	3.815
tICT	-239.47938	-7.453	-402.87299	4.824	-11.15462	-0.168	111.42500	1.442	-418.14027	-7.520	35.22156	0.280	-356.87364	-2.347		
ES	0.31852		0.05944		0. 04297		0.02965		0.10962		0.02392		0.08681		0.32907	
	R-Square = 0.1659															

uted using adding up restrictions.

TABLE 68
Estimation Results, Quintile 2

Variable	Cereal		Fruits & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Nonfood*	
	Parameter Estimate	T for H0: Parameter=0	Parameter Estimate	T for H0: Parameter=0	Parameter Estimate	T for H0: Parameter=0	Parameter Estimate	T for H0: Parameter=0	Parameter Estimate	T for H0: Parameter=0	Parameter Estimate	T for H0: Parameter=0	Parameter Estimate	T for H0: Parameter=0	Parameter Estimate	T for H0: Parameter=0
INTERCEP	1.10273	29.924	0.06955	4.211	-0.08703	4.130	4.02182	-1.271	0.10747	3.625	-0.04108	-4.101	0.15708	6.063	-0.28690	-0.748
CRL-LOG	0.08953	4.895	0.01792	2.723	0.06259	5.771	4.00147	-0.166	0.02523	2.887	-0.01394	-2.644	-0.05004	17.586	-0.12983	-2.992
FRUT-LOG	0.01792	2.723	0.00764	1.684	0.00079	0.159	0.00702	1.658	0.00408	0.976	-0.00140	-0.538	-0.00907	-7.014	-0.02698	-3.457
MEAT-LOG	0.06259	5.771	0.00079	0.159	-0.07777	-6.499	-0.00129	-0.170	0.01360	2.315	0.01349	2.814	0.00945	5.617	-0.02085	-0.542
DAEG-LOG	4.00147	-0.166	0.00702	1.658	-0.00129	-0.170	-0.00052	-0.057	0.00136	0.275	0.00992	2.259	0.00516	3.751	-0.02018	-4.833
FISH-LOG	0.02523	2.887	0.00408	0.976	0.01360	2.315	-0.00136	0.275	0.00133	0.162	-0.00141	-0.474	001287	5.752	-0.05705	-6.470
BEV-LOG	-0.01394	-2.644	-0.00140	4.538	0.01349	2.814	0.00992	2.259	4.-0141	-0.474	-0.00177	-0.445	0.00427	5.244	-0.00915	-1.096
OTHE-LOG	-0.05004	-17.586	-0.00907	-7.014	0.00945	5.617	0.00516	3.751	0.01267	5.752	0.00427	5.244	0.04307	21.144	-0.01571	-0.606
NFOD-LOG	-0.12983	-14.411	-0.02697	4.697	0.02085	-3811	-0.02018	-4.520	-0.05705	-8.561	-0.00915	-3.462	-0.01571	-4.546	0.27974	7.112
Y	-0.10367	-25.551	0.00097	0.533	0.01741	7.502	0.00837	4.431	-0.00149	-0.457	0.00799	7.242	-0.00430	-1.507	0.07472	1.938
MEMO-6	-0.04970	-0.622	0.00392	1.165	0.01233	2.874	0.03448	9.874	0.00863	1.427	0.00714	3.506	0.00309	0.584	-0.01988	0.842
MEM7-14	-0.00167	-0.274	-0.00652	-2.393	0.00220	0.633	-0.00774	-2.733	-0.00187	-0.381	0.00273	1.654	0.00819	1.912	0.00467	0.909
HH-EDGR	-0.00591	-1.175	-0.01057	-4.704	0.00178	0.619	0.00197	0.844	0.00516	1.276	0.00224	1.641	-0.00618	-1.747	0.01150	2.127
HH-EDHI	-0.01093	-4.427	-0.00242	-2.191	0.00274	1.939	0.00358	3.116	-0.00670	-3.369	0.00060	0.890	-0.00347	-1.994	0.01661	3.437
HH-EDCO	-0.00866	-1.767	-0.00272	-1.239	000235	0.838	000598	2.624	-0.00195	-0.494	0.00036	0.267	-0.00405	-1.174	0.00870	1.993
REG-1	0.02628	4.033	-0.00709	-2.397	-0.01122	-2.967	-0.01938	-6.280	-0.01179	-2.266	0.00507	2.767	-0.00908	-2.032	0.02721	1.935
REG 2	-0.00737	-0.977	0.00430	1.186	0.00779	1.720	-0.01879	-5.060	-0.01053	-1.778	0.00198	0.892	-0.00326	-0.665	0.02589	3.014
REG 3	-0.00709	-1.058	-0.01549	-5.303	-0.00256	-0.675	-0.01391	-4.505	-0.01109	-2.146	0.00036	0.200	0.00272	0.625	0.04706	7.138
REG 4	0.01063	1.662	-0.01197	-4.263	-0.02684	-7.236	-0.01720	-5.633	0.01348	2.760	0.00046	0.260	0.00524	1.271	0.02619	1.863
REG 5	0.00103	0.157	-0.01152	-3.857	-0.03393	-8.851	-0.01329	-4.230	0.02956	5.672	-0.00190	-1.006	-0.00302	-0.677	0.03306	1.868

TABLE 6B (CONTINUED)

Variable	Cereal		Fruits & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Nonfood*	
	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0
REG 6	0.03418	5330	-0.02356	-8.198	-0.04061	-10.838	-0.02117	-6.920	0.01540	3.037	0.00407	2.278	-0.01874	-4.408	0.05043	2.094
REG 7	0.01300	1.839	-0.02481	-7.891	-0.02170	-5.044	-0.01611	-4.750	0.03790	6.900	0.00759	3.784	0.00293	0.622	0.00119	0.057
REG 8	0.01757	2.366	-002031	-0.148	-0.02312	-5.423	-0.01757	-5.050	0.03793	6.450	-0.00567	-2.788	-0.01276	-2.567	0.02394	1.135
REG 9	0.03878	5 069	-0.00716	-2.046	-0.04277	-9.529	-0.02082	-5.719	0.02662	4.380	0.00405	1.895	-0.02328	-4.489	0.02458	0.920
REG 10	0.05120	7.435	-0.01313	4.318	-0.03760	-9.552	-0.02068	-6.463	0.01701	3.136	0.00037	0.197	-0.00884	-1.909	0.01168	0.438
REG 11	0.02786	4.172	-0.00827	-2.839	-0.03062	-7.983	-0.02136	-6.886	0.02587	5.021	0.00093	0.509	-0.01114	-2.554	0.01673	0.809
REG 12	0.03767	-0.895	-0.00761	-2.219	-0.02761	-0.149	-0.01607	-4.387	0.00466	0.765	0.00119	0.557	-0.01654	-3.157	0.02430	1.235
REG 13	-0.00364	4.366	-0.01026	-2.293	0.00826	1.432	-0.01296	-2.757	-0.03731	-04.677	0.00343	1.249	-0.00999	-1.463	0.06247	4.583
REG 14	0.01986	2.247	-0.02518	-6.173	-0.05771	-10.987	-0.03169	-7.343	0.01394	1.990	0.01420	5.580	0.00905	1.514	0.05753	2.077
HH-AGE	0.00010	0.988	-0.0008	-1.726	0.00009	1.557	-0.0011	-2.302	-0.00016	-1.957	-0.00006	-2.047	-0.00005	-0.651	0.00025	2.862
RESTRICT	-397.44156	-10.361	-668.06573	-7.472	138.93958	2.335	71.23944	1.0'9	-194.66887	-3.274	-76.96513	-0.637	-316.34060	-2.531		
SHARES	0.24978		0.05696		0.05392		0.03680		0.10740		0.02932		0.09172		0.37411	

System R-Square = 0.1483

*Computed using adding up restrictions.

TABLE 6C
Estimation Results, Quintile 3

Variable	Cereal		Fruits & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Nonfood*	
	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0
INTERCEP	1.10636	38.220	0.04784	3.374	-0.12178	-5.653	0.01362	0.913	0.15011	5.955	-0.02070	-2.140	0.16914	6.390	-0.34458	-0.896
CRL-LOG	0.04313	3.001	0.00891	1.566	0.04840	4.703	0.01239	1.637	0.05696	7.891	0.02648	-5.408	-0.04167	-16.644	-0.10165	-2.893
FRUT-LOG	0.00891	1.566	0.01329	3.021	0.01498	2.832	0.00997	2.414	0.00297	0.774	-0.00347	-1.259	-0.01173	-9.449	-0.03492	-3.889
MEAT-LOG	0.04840	4.703	0.01498	2.832	-0.04982	-3.833	-0.01854	-2.466	0.01512	2.477	0.02313	4.553	0.00762	4.010	-0.04089	-1.400
DAEG-LOG	0.01239	1.637	0.00997	2.414	-0.01854	-2.466	-0.00626	4.730	0.00168	0.375	0.01578	3 634	0.00369	2.768	-0.01871	-1.697
FISH-LOG	0.05696	7.891	0.00297	0.774	0.01512	2.477	0.00168	0.375	0.01277	1.712	-0.00071	-0.238	0.00631	2.938	-0.09509	-5.140
BEV-LOG	-0.02648	-5.408	-0.00347	-1259	0.02313	4.553	0.01578	3.634	-0.00071	-0.238	-0.00450	1.099	0.00348	3.990	-0.01623	1.111
OTHE-LOG	-0.04167	-16.644	-0.01173	-9.449	0.00762	4.010	0.00369	2.768	0.00631	2.938	0.00348	3.990	0.04442	19.261	-0.01212	-0.510
NFOD-LOG	-0.10165	-12.626	-0.03492	-8.722	-0.04089	-6.448	-0.01871	-4.247	-0.09509	-14.452	-0.01623	-5.516	-0.01212	-3.180	0.31960	9.208
Y	-0.10416	-33.382	0.00190	1.245	0.02263	9.744	0.00365	2.271	-0.00496	-1.826	0.00553	5.307	-0.00513	-1.799	0.08054	2.076
MEM0-6	-0.05495	-9.264	0.00576	1.963	0.01796	4.070	0.04465	14.619	-0.01225	-2.370	0.01068	5.390	-0.00050	-0.926	-0.00682	0.240
MEM7-14	-0.01556	-3.178	-0.00740	-3.088	0.00440	t 207	-0.00649	-2.575	-0.01476	-3.458	0.00171	1.047	0.01333	2.977	0.02477	2.533
HH-EDGR	0.00547	1.294	-0.00545	-2.633	0 00019	0.059	-0.00074	-0.341	-0.00826	-2.240	0.00162	1.148	-0.00052	-0.134	0.00769	1.835
HH-EDHI	-0.01069	-5.423	-0.00340	-3.520	0.00497	3.390	0.00329	3.249	-0.00831	-4.837	0.00140	2.128	-0.00011	-0.060	0.01283	2.351
HH-EDCO	-0.00595	-2.029	-0.00353	-2.460	0.00117	0.536	0.00262	1.738	-0.00405	-1.585	-0.00194	-1.983	-0.00795	-2.962	0.01964	5.653
REG 1	0.01649	3.721	-0.00450	-2.014	-0.02168	-6.519	-0.01412	-5.996	-0.01109	-2.916	-0.00059	-0.376	-0.01877	-4.838	0.05446	4.507
REG 2	0.00502	0.915	-0.00214	-0.716	-0.00577	-1.349	-0.00998	-3.276	-0.00731	-1.592	0.00066	0.323	-6.01198	-2.693	0.03150	5.642
REG 3	-0.00831	-2.003	-0.01104	-5.666	-0.00825	-2.731	-0.00868	-4.123	-0.01598	-4.763	-0.00026	-0.186	0.00013	0.040	0.05238	9.854
REG 4	0.01420	3.632	-0.00958	-5.075	-0.02916	-9.890	-0.00808	-3.807	0.00651	2.101	0.00236	1.726	-0.00369	-1.207	0.02744	2.129
REG 5	0.00653	1.375	-0.00450	-1.892	-0.03699	-10.268	-0.00405	-1.596	0.03494	8.583	-0.00237	-1.398	-0.01079	-2.585	0.01723	0.870

TABLE 6C (CONTINUED)

Variable	Cereal		Fruits & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Nonfood*	
	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0
REG 6	0.02415	5.663	4.02073	-9.815	4.05762	-17.624	4.01637	-7.132	001057	2.924	0.00476	3.211	4.02175	-6.138	0.07698	3.084
REG 7	0.00683	1.358	4.02409	-9.820	4.02212	-5.519	4.01179	4.379	0.02668	6.453	0.00963	5.461	0.00290	0.690	0.01198	0.700
REG 8	0.01690	3.234	4.01434	-5.631	4.03207	-8.224	4.00738	-2.721	0 02853	6.378	4.00263	-1.498	4.01929	4.279	0.03028	1.560
REG 9	0.03644	7.306	4.00492	-1.834	4.04861	-12.033	4.01128	4.027	0.02193	4.884	0.00759	4.155	4.03161	-6.928	0.02846	1.023
REG 10	0.04373	9.132	4.01174	-5.090	4.04277	-12.028	4.01127	4.566	001461	3.614	0.00522	3.236	4.02128	-5.168	0.02350	0.915
REG 11	0.02621	5.892	4.00412	-1.944	4.04034	-12.164	4.01480	-6.442	0.02177	5.949	0.00560	3.728	4.01718	4.669	0.02287	1.057
REG 12	0.04102	6.875	4.00410	-1.407	4.03999	-8.843	4.01750	-5.532	0.00588	1.355	0.00368	1.793	4.02108	4.040	0.03109	1.305
REG 13	4.00104	4.140	0.00223	0.609	4.00394	4.702	4.01252	-3.210	4.03219	-5.011	0.00520	2.056	4.01888	-2.889	0.06114	4.960
REG 14	0.04200	6.746	4.01935	-6.040	4.07407	-15.238	4.02838	-8.188	0.00630	1.205	0.00945	4.173	0.00899	1.713	0.05507	1.608
HH-AGE	0.00000	0.049	4.00002	4.417	4.00001	4.199	4.00012	-3.161	4.00024	-3.665	4.00002	4.812	4.00013	-1.931	0.00054	6.392
RESTRICT	-621.36714	-13.754	-720.40572	-7.662	25.65823	0.454	32.00726	0.424	-50.64712	4.785	162.50435	1.347	-42.03706	4.370		
SHARES	0.19987		0.05395		0.06535		0.03977		0.09442		0.03181		0.09454		0 42020	

System R-Square = 0.1678.

*Computed using adding up restrictions

TABLE 6D
Estimation Results, Quintile 4

Variable	Cereal		Fruits & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Nonfood*	
	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0
INTERCEP	0.93854	44.503	0.08687	7.581	4.05140	-2.580	0.03724	2.944	0.23898	13.483	0.02379	2.936	0.18614	6.939	-0.46016	1.476
CRL-LOG	0.03936	3.262	0.01480	2.920	0.05255	5.319	0.01530	2.157	0.03229	5.410	-0.01261	-2.745	-0.04172	-16.913	-0.09997	3.338
FRUT-LOG	0.01480	2.920	0.00615	1.462	0.01277	2.353	0.00625	1.500	0.01270	3.689	0.00180	0.645	-0.01205	-8.955	-0.04244	-4.963
MEAT-LOG	0.05255	5.319	001277	2.353	-0.02546	-1.852	-0.02384	-3.109	002566	4.228	0.01683	3.250	0.00208	0.884	-0.06059	-2.373
DAEG-LOG	0.01530	2.157	0.00625	1.500	-0.02384	-3.109	-0.00363	-0.428	0.00431	1.005	0.01212	2.818	0.00159	1.051	-0.01210	-1.011
FISH-LOG	0.03229	5.410	0.01270	3.689	0.02566	4.228	0.00431	1.005	0.02657	4.348	0.00343	1.192	-0.00022	-0.106	-0.10475	-8.630
BEV-LOG	-0.01261	-2.745	0.00180	0.645	0.01683	3.250	0.01212	2.818	0.00343	1.192	-0.00529	-1.280	0.00126	1.286	-0.01754	-1.911
OTHE-LOG	-0.04172	-16.913	-0.01205	-8.955	0.00208	0.884	0.00159	1.051	-0.00022	-0.106	0.00126	1.286	0.05823	18.614	-0.00916	-0.334
NFOD-LOG	-0.09997	-12.079	-0.04244	-9.260	-0.06059	-7.365	-0.01210	-2.292	-0.10475	-15.582	-0.01754	-4.884	-0.00916	-1.858	0.34655	9.252
Y	-0.08518	-39.281	-0.00231	-1.962	0.01476	7.206	0.00081	0.620	-0.01588	-8.714	0 00130	1.559	-0.00457	-1.655	0.09107	2.973
MEM0-6	-0.04310	-9.354	-0.00166	-0.665	0.02246	5.161	0.04988	18.073	-0.00868	-2.240	000818	4.632	-0.01782	-3.037	-0.00925	0.336
MEM7-14	-0.01179	-3.108	-0.00303	-1.473	0.02016	5.628	-000259	-1.141	-0.00971	-3.045	0.00234	1.607	0.00143	0.296	0.00320	0.329
HH-EDGR	0.00008	0.020	-0.00486	-2.300	-0.00751	-2.041	0.00005	0.020	-0.00663	-2.024	-0 00164	-1.095	-0.00660	-1.332	0.02713	8.884
HH-EDH	-0.00732	-4.517	-000276	-3.144	0.00224	1.467	000015	0.157	-0.00841	-6.177	0.00022	0.346	-0.00017	-0082	0.01605	4.241
HH-EDCO	-0.00639	3.522	-0.00299	-3.040	000237	1.381	0.00335	3.084	-0.00939	-6.151	-0.00092	-1.323	-0.01199	-5.195	0.02596	4.820
REG 1	0.00814	2.425	-0.00675	-3.563	-0.02330	-7.254	-0.01130	-5.386	-0.01378	-4.972	0.00130	0.934	-0.00259	-0.648	0.04829	5.020
REG 2	-0.00169	-0.381	-0.00088	-0.329	-0.01191	-2.766	-0.00909	-3.163	-0.00945	-2.640	0.00133	0.694	0.00130	0.267	0.03040	5.852
REG 3	-0.01185	-3.939	-0.01270	8.234	-000965	-3.538	-0.00753	-4.239	-0.01236	-5.381	-0.00163	-1.394	0.01075	3.576	0.04495	5.712
REG 4	0.00596	2.109	-0.01054	-6.997	-0 02226	-8.460	-0.00924	-5.055	0.00181	0.879	-0.00084	-0.729	0.00041	0.150	0.03470	3.881
REG 5	-0.00150	-0.364	-0.01033	-4.502	-0.04241	-10.773	-0.00450	-1.770	0.01335	3.918	-0.00379	-2.254	-0.01485	-2.976	0.06402	4.043

TABLE 6D (CONTINUED)

Variable	Cereal		Fruits & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Nonfood*	
	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0
REG 6	0.01319	3.835	-0.01826	-9.680	-0.05765	-17.550	-0.01381	6.435	0.00468	1.668	0.00266	1.940	-0.01757	4.547	0.08677	4.006
REG 7	0.00665	1.680	-0.01922	-9.065	-0.02131	-5.348	-0.01173	-4.756	0.01897	6.126	0.00255	1.585	0.01521	3.414	0.00888	0.589
REG 8	0.01798	3.964	-0.01959	-7.961	-0.03249	-7.582	-0.00312	-1.146	0.00913	2.417	-0 00544	-3.116	-0.02700	-4.904	0.06054	3.503
REG 9	0.02953	6.483	-0.00493	-1.921	-0.04415	-10.059	-0.00671	-2.388	0.01525	4.059	0.00934	5.146	-0.03407	-6.205	0.03573	1.461
REG 10	0.03517	9.394	-0.00867	-4.363	-0.04004	-11.445	-0.01244	-5.548	0.00843	2.784	0.00168	1.157	-0.02426	-5.432	0.04014	1.794
REG 11	0.02727	8.009	-000596	-3.321	-0.03771	-11.851	-0.01252	6.120	0.01989	7.430	0.00459	3.447	-0.02110	-5.505	0.02554	1.208
REG 12	0.02207	3.876	-0.01070	-3.473	-0.04010	-7.420	-0.01303	-3.742	0.00376	0.801	0.00276	1.234	-0.02620	-3.771	0.06145	3.221
REG 13	-0.00037	-0.073	0.00075	0.274	-0.02111	-4.410	-0.00746	-2.415	-0.02672	-6.407	-0.00065	-04.326	-0.02226	-3.789	0.07782	7.074
REG 14	0.03344	6.279	-0.01356	4.434	-0.06368	-12.208	-0.02230	-6.454	0.00130	-0.302	0.00892	3.975	0.00003	0.004	0.05845	2.095
HH-AGE	-0.00011	-1.934	-0.00011	-3.498	0.00008	1.532	-0.00010	-2.766	4.00015	-3.056	-0.00008	-3.712	-0.00036	-4.903	0.00082	6.833
RESTRICT	-682.18008	-13.831	-369.07474	-3.872	42.75968	0.832	90.69948	1.224	170.00057	2.381	-13.92661	-0.116	97.38911	1.112		
SHARES	0.14736		0.04942		0.07719		0.41740		0.07697	0.32031			0.09932		0.47596	
System R-Square = 0.1684																

*Computed using adding up restrictions.

TABLE 6E
Estimation Results, Quintile 5

Variable	Cereal		Fruits & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Nonfood*	
	Para-meter Estimate	T for Ho: Para-meter=0	Para-meter Estimate	T for Ho: Para-meter=0	Para-meter Estimate	T for Ho: Para-meter=0	Para-meter Estimate	T for Ho: Para-meter=0	Para-meter Estimate	T for Ho: Para-meter=0	Para-meter Estimate	T for Ho: Para-meter=0	Para-meter Estimate	T for Ho: Para-meter=0	Para-meter Estimate	T for Ho: Para-meter=0
INTERCEP	0.50865	51.873	0.12941	19.576	0.19205	14.858	0.12306	17.234	0.22383	25.676	0.09456	21.570	0.38741	22.718	-0.65896	-4.603
CRL-LOG	0.04723	4.463	0.02601	5.556	0.04178	4.354	0.00658	0.964	0.01221	2.337	-0.01142	-2.649	-0.03443	-15.183	-0.08795	-3.273
FRUT-LOG	0.02601	5.556	0.00764	1.879	0.00959	1.717	-0.00519	1.286	0.01661	5.023	-0.00291	-1.097	-0.01600	-10.656	-0.04601	-3.690
MEAT-LOG	0.04178	4.354	0.00959	1.717	-0.01495	1.015	-0.01599	-2.086	0.02993	4.717	0.01463	2.902	0.01425	4.88	-0.07925	-4.011
DAEG-LOG	0.00658	0.964	0.00519	1.286	-0.01599	-2.086	0.00436	0.528	0.1257	2.983	0.00966	2.334	-0.00057	-0.346	-0.02179	-2.507
FISH-LOG	0.01221	2.337	0.01651	5.023	0.02993	4.717	0.01257	2.983	0.02564	4.685	0.01205	4.345	-0.00006	-0.028	-0.10885	-11.902
BEV-LOG	-0.01142	-2.649	-0.00291	1.097	0.01463	2.902	0.00900	2.334	0.01205	4.345	-0.00101	-----	0.00131	1.276	-0.02231	-2.581
OTHE-LOG	-0.03443	-15.183	-0.01600	-10.656	0.01425	4.888	-0.00057	-0.346	-0.00006	-0.028	0.00131	1.276	0.05331	14.091	-0.01782	-0.707
NFOD-LOG	-0.08795	-10.883	-0.04601	-8.480	-0.07925	-7.254	-0.02179	-3.559	-0.10885	-15.469	-0.02231	-5.472	-0.01782	-2.894	0.38397	11.214
Y	-0.04032	-47.095	-0.00834	-14.440	-0.00995	-8.817	-0.00834	-13.384	-0.01654	-21.731	-0.00606	-15.841	-0.02438	-16.376	0.11393	9.970
MEM0-6	-0.01601	-4.826	-0.00147	-0.655	0.01148	2.625	0.05905	21.094	-0.01088	-3.687	0.00598	4.037	-0.05533	-9.585	0.01527	-0.515
MEM7-14	-0.00995	-3.750	-0.00420	-2.348	0.01330	3.801	-0.00691	-3.578	-0.00970	-4.111	0.00330	2.783	-0.03110	-6.734	0.04526	3.577
HH-EDGR	-0.00363	-0.851	0.00382	1.330	-0.00654	-1.164	-0.00097	-0.312	0.00188	0.497	-0.00326	-1.710	-0.00311	-0.420	0.01179	3.596
HH-EDHI	-0.00801	-5.870	-0.00241	-2.618	0.00494	2.745	0.00233	2.347	-0.00480	-3.956	0.00109	1.785	-0.00053	-0.223	0.00739	1.811
HH-EDCO	-0.00525	-4.626	-0.00321	-4.191	-0.00092	-0.613	-0.00057	-0.684	-0.00611	-6.053	-0.00228	-4.488	-0.00114	-0.578	0.01947	9.613
REG 1	-0.00275	-1.005	-0.00489	-2.592	-0.01328	-3.739	-0.00438	-2.132	-0.01127	-4.770	0.00409	3.116	-0.01639	-3.778	0.04886	7.486
REG 2	-0.02262	-6.460	-0.00975	-3.804	-0.0113	-2.919	-0.00709	-2.365	-0.01528	-5.174	0.00111	0.641	-0.01200	-2.410	0.07875	11.614
REG 3	-0.01640	-7.255	-0.00795	-5.794	-0.00416	-1.546	-0.00046	-0.290	-0.00512	-2.916	-0.00079	-0.770	0.00395	1.428	0.03092	5.120
REG 4	-0.00627	-2.979	-0.01041	-8.214	-0.01119	-4.586	-0.00364	-2.288	-0.00082	-0.544	0.00127	1.314	-0.00762	-3.158	0.03868	8.879
REG 5	-0.01335	-3.986	-0.1323	-5.840	-0.03476	-7.924	-0.00063	-0.254	0.00091	0.310	-0.00267	-1.718	-0.02922	-5.211	0.09294	7.130

TABLE 6E (CONTINUED)

Variable	Cereal		Fruits & Veg.		Meat		Dairy & Eggs		Fish		Beverage		Others		Non-food*	
	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0	Parameter Estimate	T for Ho: Parameter=0
REG 6	0.00121	0.457	-0.01805	-10.308	-0.04975	-14.693	-0.00424	-2.150	-0.00045	-0.199	0.00270	2.219	-0.02941	-7.538	0.09799	5.380
REG 7	0.00466	1.510	-0.01698	-8.734	-0.01974	-4.869	-0.00264	-1.181	0.00893	3.632	0.00392	2.781	-0.00184	-0.418	0.02369	2.328
REG 8	0.00298	0.790	-0.01827	-7.222	-0.03849	-7.767	-0.00150	-0.546	0.01236	3.721	-0.00389	-2.309	-0.04011	-6.382	0.08692	4.578
REG 9	0.02103	5.240	-0.00218	-0.794	-0.03990	-7.542	0.00348	1.175	0.00538	1.534	0.00748	4.005	-0.04280	-6.412	0.04751	2.082
REG 10	0.01502	4.479	-0.01075	-4.943	-0.03347	-7.826	-0.00350	-1.452	0.00861	3.025	0.00243	1.623	-0.03172	-5.890	0.05338	3.044
REG 11	0.01001	3.744	-0.00761	-4.465	-0.03347	-9.979	-0.00921	-4.800	0.00514	2.356	0.00340	2.829	-0.02376	-5.924	0.05550	3.759
REG 12	0.01937	4.234	-0.01048	-3.452	-0.02437	-4.097	-0.00043	-0.127	0.00397	1.004	0.00695	3.341	-0.03766	-5.004	0.04265	2.352
REG 13	0.00131	0.338	-0.00308	-1.197	-0.01165	-2.335	-0.01144	-4.001	-0.01837	-5.416	0.00187	1.056	-0.02006	-3.413	0.06143	7.402
REG 14	0.02587	4.434	-0.01568	-3.948	-0.06713	-8.814	-0.01841	-4.213	0.00450	0.900	0.01145	4.199	-0.00585	-0.628	0.06525	2.363
HH_AGE	-0.00010	-2.652	-0.00003	-1.353	-0.00003	-0.577	-0.00012	-4.455	-0.00001	-0.394	-0.00009	-5.312	-0.00049	-7.357	-0.00087	5.760
RESTRICT	-450.10050	-8.335	-161.07158	-1.725	109.57935	2.452	-51.21217	-0.712	100.85898	1.312	-66.14843	-0.546	346.12469	4.877		
SHARES	0.08981		004168		0.08290		0.03705		0.05341		0.02720		0.09009		0.57786	
System R-Square = 0.1921																

*Computed using adding up restrictions.

TABLE 7A
Elasticities; Quintile 1

	PRICES								
	Cereal	Fruits & Veg.	Meat	Dairy & Eggs	Fish	Beverage	Others	Nonfood	Income
Cereal	-0.5360	-0.0513	0.1441	-0.0251	0.1328	0.0422	-0.1713	-0.4510	0.6786
Fruits & Veg.	-0.2747	-0.6122	0.0811	0.1077	-0.0680	0.0500	-0.1737	-0.1101	1.0104
Meat	1.0684	0.1121	-1.8996	-0.2772	-0.0972	0.3923	0.1242	-0.4231	1.4275
Dairy & Egg	-0.2700	0.2159	-0.4017	-0.3267	0.0277	-0.0814	0.1595	-0.3233	1.2922
Fish 0.3859	-0.0369	-0.0381	0.0075	-1.0309	0.0326	0.1220	-0.3770	1.0553	
Beverage	-0.5620	0.1242	0.7047	-0.1009	-0.1495	-1.0273	0.2073	-0.1966	1.3611
Others	-0.6286	-0.1190	0.0615	0.0545	0.1540	0.0571	-0.5935	0.0139	0.8583
Nonfood	-0.4366	-0.0199	-0.0552	-0.0291	-0.1256	-0.0143	0.0037	-0.3230	1.2198

TABLE 7B
Elasticities; Quintile 2

	PRICES								
	Cereal	Fruits & Veg.	Meat	Dairy & Eggs	Fish	Beverage	Others	Nonfood	Income
Cereal	-0.6416	0.0717	0.2506	-0.0059	0.1010	-0.0558	-0.2003	-0.5198	0.5850
Fruits & Veg.	0.3146	-0.8658	0.0138	0.1233	0.0716	-0.0246	-0.1592	-0.4736	1.0170
Meat	1.1608	0.0146	-2.4422	-0.0239	0.2521	0.2501	0.1752	-0.3867	1.3229
Dairy & Egg	-0.0399	0.1908	-0.0350	-1.0142	0.0369	0.2695	0.1403	-0.5484	1.2276
Fish 0.2349	0.0380	0.1266	0.0127	-0.9876	-0.0131	0.1198	-0.5312	0.9861	
Beverage	-0.4755	-0.0478	0.4600	0.3382	-0.0481	-1.0602	0.1455	-0.3121	1.2725
Others	-0.5456	-0.0989	0.1030	0.0563	0.1403	0.0465	-0.5304	-0.1713	0.9531
Nonfood	-0.3470	-0.0721	-0.0557	-0.0539	-0.1525	-0.0245	-0.0420	-0.2523	1.1997

TABLE 7C
Elasticities; Quintile 3

	PRICES								
	Cereal	**Fruits & Veg.**	**Meat**	**Dairy & Eggs**	**Fish**	**Beverage**	**Others**	**Nonfood**	**Income**
Cereal	-0.7842	0.0446	0.2422	0.0620	0.2850	-0.1325	-0.2085	-0.5086	0.4789
Fruits & Veg.	0.1651	-0.7537	0.2777	0.1848	0.0551	-0.0644	-0.2175	-0.6472	1.0353
Meat	0.7406	0.2292	-1.7624	-0.2837	0.2314	0.3539	0.1167	-0.6257	1.3463
Dairy & Egg	0.3116	0.2507	-0.4662	-1.1573	0.0423	0.3968	0.0927	-0.4706	1.0918
Fish 0.6033	0.0315	0.1602	0.0178	-0.8648	-0.0076	0.0668	-1.0071	0.9474	
Beverage	-0.8324	-0.1092	0.7271	0.4961	-0.0224	-0.8586	0.1095	-0.5101	1.1739
Others	-0.4403	-0.1240	0.0806	0.0389	0.0666	0.0368	-0.5306	-0.1280	0.9458
Nonfood	-0.2419	-0.0831	-0.0973	-0.0445	-0.2263	-0.0386	-0.0288	-0.2394	1.1917

TABLE 7D
Elasticities; Quintile 4

	PRICES								
	Cereal	**Fruits & Veg.**	**Meat**	**Dairy & Eggs**	**Fish**	**Beverage**	**Others**	**Nonfood**	**Income**
Cereal	-0.7329	0.1005	0.3566	0.1038	0.2191	-0.0856	-0.2831	-0.6784	0.4220
Fruits & Veg.	0.2995	-0.8755	0.2584	0.1265	0.2571	0.0364	-0.2438	-0.8586	0.9532
Meat	0.6808	0.1655	-1.3298	-0.3089	0.3324	0.2181	0.0269	-0.7850	1.1912
Dairy & Egg	0.3666	0.1498	-0.5712	-1.0870	0.1032	0.2904	0.0380	-0.2898	1.0193
Fish 0.4195	0.1651	0.3334	0.0560	-0.6548	0.0446	-0.0028	-1.3610	0.7937	
Beverage	-0.3938	0.0562	0.5255	0.3784	0.1072	-1.1651	0.0392	-0.5477	1.0406
Others	-0.4200	-0.1213	0.0209	0.0160	-0.0022	0.0127	-0.4137	-0.0922	0.9540
Nonfood	-0.2100	-0.0892	-0.1273	-0.0254	-0.2201	-0.0369	-0.0192	-0.2719	1.1913

TABLE 7E
Elasticities; Quintile 5

	PRICES								
	Cereal	**Fruits & Veg.**	**Meat**	**Dairy & Eggs**	**Fish**	**Beverage**	**Others**	**Nonfood**	**Income**
Cereal	-0.4741	0.2895	0.4652	0.0732	0.1359	-0.1272	-0.3833	-0.9792	0.5511
Fruits & Vec.	0.6240	-0.8168	0.2301	0.1245	0.3960	-0.0699	-0.3839	-1.1039	0.8000
Meat	0.5040	0.1157	-1.1803	-0.1929	0.3611	0.1765	0.1719	-0.9559	0.8800
Dairy & Egg	0.1775	0.1400	-0.4317	-0.8823	0.3393	0.2608	-0.0154	-0.5882	0.7748
Fish 0.2286	0.3090	0.5604	0.2353	-0.5200	0.2256	-0.0010	-2.0378	0.6903	
Beverage	-0.4199	-0.1071	0.5380	0.3552	0.4429	-1.0371	0.0483	-0.8203	0.7771
Others	-0.3822	-0.1776	0.1582	-0.0063	-0.0006	0.0146	-0.4083	-0.1978	0.7294
Nonfood	-0.1522	-0.0796	-0.1371	-0.0377	-0.1884	-0.0386	-0.0308	-0.3355	1.1972

of the alternative sources of protein, namely, meat and fish, is also evident from the results except for the first quintile.

As expected, cereals are income inelastic for all income groups. For the second and third income quintiles fish and other food are added as income inelastic commodities. In the case of the fourth income quintile, fruits are income inelastic in addition to fish, other food and cereals. Finally, for the highest income quintile, all food items are income inelastic.

Comparison with Previous Estimates

Table 8 shows the average own-price elasticities computed by previous researchers. Average income/expenditure elasticities, on the other hand, are given in Table 9. As expected, the cereals family is less price elastic than the more expensive sources of protein such as meats, dairy products or fish. Fish is also less price elastic than meat. This pattern is also exhibited by the elasticities obtained in this study. In terms of income elasticities, the ones obtained in this study are generally slightly bigger than those obtained in other studies except for those reported in Quisumbing et al. (1988). The pattern for income elasticities is also similar – low for the cereals family and fish and higher for the other sources of protein.

The price elasticities by income stratum are characterized by higher elasticities for lower-income groups than for higher-income groups. Families in the lower-income stratum are expected to respond more to prices changes than families with higher income. Income/expenditure elasticities are also expected to be higher for lower-income groups than for higher-income groups, particularly for the more expensive food items which are likely to be considered luxury food items by lower-income groups. These patterns are borne by the estimates in the previous studies (Tables 10 and 11) as well as by this study. The computed income elasticities in this study are in-between the clearly high elasticities obtained in Quisumbing (1985) and the very low income elasticities reported in FNRI (1981, 1984) and are closer to those obtained by Belarmino (1983) and Regalado (1984).

TABLE 8
Uncompensated Own-Price Elasticities of Selected Food Items

Source	Aggregate Food	FOOD ITEMS								
		Rice	Corn	Wheat	Cereals	Fish	Meat	Pork	Eggs	Dairy Products
Luch, Powell and Williams (1 977)	-0.35									
Pante (1977)	-0.16									
Quisumbing et al. (1988)	-0.77	-1.19	-0.00	–	–	-2.73	-4.28	–	-6.81	-3.46
Balisacan (1993)	–	–	–	–	-1.16	–	-1.17	–	–	–
Canlas (1 983)		–	–	–	-0.26	–	–	–	–	-0.77
San Juan (1978)	–	-0.40	0/07	-1.65	–	–	–	-1.21	-0.54	-0.44
Snall (1980)		-0.45	-1.14	-1.10	–	–	–	–	–	–
Bouis (1982)		-0.63	-1.34	-0.78	–	–	–	–	–	–
World Bank (1991)		-0.20	-0.27	-0.57	–	-0.03	-0.79	–	–	–
Huang & David (1993)		-0.96	-0.35	–	–	–	–	–	–	–
MA-IAPMP (1 980)		-0.37	–	-1.30	–	–	–	–	–	–

Abbreviations: MA-IAPMP=Ministry of Agriculture Integrated Agricultural Production & Marketing Project.

TABLE 9
Income/Expenditure Elasticities of Selected Food Items

Source	Aggregate Food	FOOD ITEMS											
		Rice	Corn	Wheat	Cereals	Fish	Meat	Pork	Eggs	Dairy Products	Poultry	Vegetables	Fruits
Luch, Powell and Williams (1977)	0.52												
Pante (1977)	0.99												
Quisumbing et al. (1988)	0.79	5.25	-1.87	–	–	8.22	3.86	–	5.70	3.06	-0.72	9.39	9.93
Canlas (1983)		–	–	–	0.30	–	–	–	–	1.00	–	–	–
Balisacan (1993)		–	–	–	0.14	–	0.60	–	–	–	–	–	–
San Juan (1978)		0.30	-0.91	0.61	–	–	–	0.62	0.62	0.48	0.49	0.41	0.38
Bouis (1982)		0.09	-0.27	0.48	–	–	–	–	–	–	–	–	–
World Bank (1991)		0.37	0.01	0.55	–	0.54	0.75	–	–	–	–	–	–
Huang & David (1993)		0.25	0.06	–	–	–	–	–	–	–	–	–	–
MA-IAPMP (1980)		0.20	–	0.45	–	–	–	–	–	–	–	–	–

Note: Elasticities for Food Items in Quisumbing, et al. are Real Food Expenditures elasticity.
Abbreviations: MA-IAPMP=Ministry of Agriculture Integrated Agricultural Production & Marketing.

TABLE 10
Own Price Elasticities by Income/Expenditure Stratum

Study	Methodology and Data Used	Commodity	Stratum			
			I	II	III	IV
Quisumbing (1985)	Double-log seemingly unrelated regressions	Rice & rice products	-1.45	-1.95	-1.20	-1.00
		Corn & corn products	-2.10	-1.57	1.51	-2.09
		Other cereal products	-3.38	-3.03	-2.69	-2.84
		Starchy roots & tubers	-3.44	-3.50	-1.77	-1.20
		Sugar and syrups	-2.05	-1.44	-0.85	4.58
		Dried beans, nuts and seeds	-1.95	-1.03	-1.77	-0.93
		Green, leafy and yellow vegetables	-2.69	-2.67	-2.04	-1.93
		Vitamin C rich foods	-2.39	-2.04	-1.25	-0.92
		Other fruits & vegetables	-2.15	-1.82	-1.64	-1.41
Belarmino (1983)	Double-log single equation, original data	Rice & rice products	-2.18	-1.92	-1.72	-1.72
		Corn & corn products	-2.55	-2.18	-2.11	-2.11
		Wheat and wheat products	-1.31	-1.21	-1.12	4.99
		Pork	-2.24	-1.54	-1.71	-1.40
		Beef	-2.63	-1.58	-1.49	-1.39
		Poultry	-2.17	0.30	-1.25	-1.64
		Processed meat	-5.33	-2.53	-1.75	-1.45
		Eggs	-1.46	-1.10	-1.08	-2.10
		Dairy products	-1.29	-1.34	-1.09	-0.92
		Crustaceans and mollusks	-1.36	-1.23	-1.15	-1.10
		Fish	-1.00	-0.83	-0.87	-0.92
		Processed fish	-0.06	-0.05	-0.10	-0.16
		Fruit	-1.03	-0.97	-0.91	-0.83
		Leafy-yellow vegetables	-0.50	-0.44	-0.10	-0.30
		Fruit vegetables	-0.85	-0.97	-0.90	-0.93
		Leguminous rootcrops, bulbs & tubers	-0.91	-0.83	-0.78	-0.74
		Oil	-1.14	-1.25	-1.40	-1.39
		Sugar	-0.87	-0.76	-0.75	-0.66
		Miscellaneous	-0.79	-0.81	-0.65	-0.69
			-0.31	-0.29	-0.30	-0.35
	Price & Income coefficients from double-log demand functions, using Zellner's SURE cross-price elasticities using Risch method	Rice & rice products	-2.24	-1.92	-1.68	-1.59
		Corn & corn products	-2.53	-2.18	-2.10	-1.94
		Wheat and wheat products	-1.36	-1.34	-1.11	-0.94
		Pork	-2.28	-1.68	-1.82	-1.68
		Beef	-2.27	-1.54	-1.42	-1.34
		Poultry	-2.21	0.46	-1.28	-1.59
		Processed meat	-5.29	-2.53	-1.76	-1.50
		Eggs	-1.53	-1.12	-1.14	-2.39

TABLE 10 (CONTINUED)

Study	Methodology and Data Used	Commodity	Stratum			
			I	II	III	IV
		Dairy products	-1.28	-1.26	-0.10	-0.79
		Crustaceans and mollusks	-1.38	-1.26	-1.17	-1.14
		Fish	-0.87	-0.54	-0.67	-0.69
		Processed	-0.03	-0.05	-0.08	-0.11
		Fruit	-1.05	-0.95	-0.88	-0.78
		Leafy-yellow vegetables	-0.53	-0.39	-0.42	-0.22
		Fruit vegetables	-0.81	-0.79	-0.76	-0.68
		Leguminous	-0.81	-0.96	-0.90	-0.97
		Rootcrops, bulbs & tubers	-1.45	-1.27	-1.43	-1.41
		Oil	-0.83	-0.68	-0.73	-0.60
		Sugar	-0.78	-0.78	-0.50	-0.62
		Miscellaneous	-0.26	-0.25	-0.26	-0.30
Regalado (1984)	Double-log, original and grouped data	Rice	-2.48	-2.64	-2.19	-1.91
		Corn	-1.39	-1.02	-0.78	-0.48
		Wheat	-1.65	-1.60	-1.36	-1.04
		Sugar	-0.72	-0.58	-0.37	-0.44
		Oil	-0.66	-0.54	-0.53	-0.38
		Fish	-1.35	-0.91	-0.87	-0.48
		Meat	-1.39	-0.50	-0.52	-0.17
		Eggs	-1.22	0.50	-0.04	-0.53
		Milk	-1.78	-0.89	-0.53	-0.11
		Fruits	-1.12	-0.99	-0.80	-0.62
		Vegetables	-1.02	-0.92	-0.90	4.80
		Miscellaneous	-0.26	-0.18	-0.16	-0 09
		Fish and seafoods	-0.73	-0.29	-0.19	-0.04
		Meat	-2.06	-2.62	-2.27	-2.05
		Poultry	-0.79	-1.07	-0.75	-1.72

TABLE 11
Income/Expenditure Elasticities by Income/Expenditure Stratum

Study	Methodology and Data Used	Commodity	Stratum			
			I	II	III	IV
Quisumbing (1985)	Double-log seemingly unrelated regressions	Rice & rice products	1.71	1.48	1.07	0.55
		Corn & corn products	1.90	1.42	0.22	0.05
		Other cereal products	1.63	2.18	1.29	2.28
		Starchy roots & tubers	0.63	1.05	0.98	1.24
		Sugar and syrups	1.77	1.30	1.45	1.42
		Dried beans, nuts and seeds	1.66	1.81	1.94	1.47
		Green, leafy and yellow vegetables	1.12	0.64	0.92	0.41
		Vitamin C rich foods	2.34	2.55	2.14	2.53
		Other fruits & vegetables	2.01	2.53	1.51	1.44
Belammino (1983)	Double-log single equation, original data	Rice & rice products	1.50	1.32	1.21	1.06
		Corn & corn products	0.21	0.16	0.12	0.09
		Wheat and wheat products	0.91	1.00	1.08	1.11
		Pork	0.90	1.15	1.26	1.28
		Beef	0.73	0.80	1.02	1.10
		Poultry	0.82	0.91	1.04	1.13
		Processed meat	0.46	0.62	0.76	0.83
		Eggs	0 85	1.02	1.08	0.97
		Dairy products	0.99	1.29	1.49	1.44
		Crustaceans and mollusks	0.55	0.63	0.78	0.94
		Fish	1.16	1.30	1.39	1.39
		Processed fish	0.85	0.92	0.89	0.93
		Fruit	1.16	1.30	1.39	1.39
		Leafy-yellow vegetables	0.66	0.73	0.87	0.82
		Fruit vegetables	0.75	0.80	0.79	0.86
		Leguminous rootcrops, bulbs & tubers	0.59	0.60	0.62	0.67
		Oil	0.53	0.43	0.56	0.60
		Sugar	0.57	0.53	0.54	0.54
		Miscellaneous	0.50	0.54	0.56	0.49
	Price & Income coefficients from double-log demand functions, using Zellner's SURE cross-price elasticities using the Risch method	Rice & rice products	0.66	0.73	0.70	0.75
		Corn & corn products	0.15	0.08	0.40	0.12
		Wheat and wheat products	-0.04	-0.07	-0.17	0.03
		Pork	0.31	0.34	0.45	0.32
		Beef	0.26	0.60	0.70	0.41
		Poultry	0.16	0.18	0.71	0.41
		Processed meat	0.02	0.35	0.49	0.37
		Eggs	0.10	0.29	0.62	0.12
			0.23	0.42	0.44	0.31

TABLE 11 (CONTINUED)

Study	Methodology and Data Used	Commodity	Stratum I	II	III	IV
		Dairy products	0.39	0.58	0.56	0.30
		Crustaceans and mollusks	0.11	0.15	0.15	0.26
		Fish	0.37	0.34	0.24	0.27
		Processed fish	0.29	0.26	0.14	0.19
		Fruit	0.15	0.40	0.65	0.47
		Leafy-yellow vegetables	0.11	0.17	0.31	0.32
		Fruits and vegetables	0.20	0.30	0.31	0.32
		Leguminous rootcrops, bulbs and tubers	0.22	0.25	0.31	0.36
		Oil	-0.02	0.21	0.41	0.28
		Sugar	0.22	0.28	0.28	0.15
		Miscellaneous	0.18	0.11	0.36	0.06
Regalado (1984)	Double-log, original and grouped data	Rice	0.10	0.15	0.20	0.23
		Corn	0.25	0.10	0.44	0.07
		Wheat	0.16	0.24	0.36	0.07
		Sugar	0.43	0.42	0.56	0.23
		Oil	0.18	0.13	0.37	0.05
		Fish	0.24	0.28	0.31	0.10
		Meat	0.47	0.40	0.24	0.06
		Eggs	0.41	0.81	0.93	0.32
		Milk	0.33	0.68	0.41	0.23
		Fruits	0.38	0.53	0.52	0.09
		Vegetables	0.13	0.41	0.68	0.12
		Miscellaneous	0.09	0.32	0.39	0.19
		Fish and seafoods	0.12	0.09	0.16	0.09
		Meat	2.07	1.00	0.91	0.56
		Poultry	1.75	2.80	3.24	4.17
			0.94	0.88	1.58	1.99
FNRI (1981)			Per Capita Income P500	P500- P1500	P1500	
	Double-log, original data	Rice	0.12	0.15	-0.08	
		Corn	-0.21	-0.21	-0.15	
		Sweet potatoes	-0.07	0.02	-0.03	
		Cassava	-0.09	-0.16	-0.03	
		Wheat	-0.19	0.67	0.26	
		Green leafy vegetables	0.1	-0.14	0.2	
		Vit. C rich foods	0.45	0.32	0.05	
		Other fruits, vegetables	0.29	0.56	0.24	
		Fresh fish	0.39	0.27	0.13	
		Fresh meat	0.03	0.46	0.72	

TABLE 11 (CONTINUED)

Study	Methodology and Data Used	Commodity	Stratum			
			I	II	III	IV
		Poultry	0.04	0.11	0.33	
		Eggs	0.09	0.65	0.23	
		Milk and milk products	0.28	1.31	0.45	
FNRI (1984)	Double-log, original data	Rice	0.05	0.33	-0.04	
		Corn	-0.10	-0.36	-0.02	
		Sweet potatoes	0.15	-0.17	-0.09	
		Cassava	-0.25	-0.05	-0.06	
		Wheat	0.58	0.75	0.51	
		Green, leafy vegetables	-0.12	-0.18	-0.19	
		Vit. C rich foods	0.31	0.46	0.35	
		Other fruits, vegetables	0.05	0.51	0.23	
		Fresh fish	0.4	0.69	0.15	
		Fresh meat	-0.01	0.59	0.9	
		Poultry	0.12	0.26	0.46	
		Eggs	0.09	0.54	0.32	
		Milk and milk products	0.11	0.93	0.85	

Quisumbing (1984) - Income Elasticities.
Belammino (1983) & Regalado (1984)-Food Expenditure Elasticities.
FNRI (1981,1984) - Per capita Income Elasticities.

Simulation Results

The impact of the recent tariff reform program is simulated. Cororaton (1996) simulated the impact of the 1988-92 tariff program using the APEX model under various measures of tariff changes. The study uses the scenario where implicit tariffs are utilized. This is the case where the average tariffs were adjusted for duty exemption, BOI incentives, duty drawback, VAT exemptions and the discriminatory excise taxes. Using the correspondence shown in Table 12, the changes in food prices and household income are computed. These are shown in Table 13. The table shows that, except for beverages, prices decline as a result of the tariff reform program. The income change shows that the program had a progressive effect as lower-income households received a higher income increase compared to higher-income households.

TABLE 12
Correspondence Between APEX Sectors and Food Commodities in this Study

APEX SECTORS	Food Commodities in this Study
1 irrigated rice 2 no-irrigated rice 3 corn 19 rice & corn milling	cereals
6 fruits 7 vegetables	fruits & veg.
10 hogs 11 poultry 12 livestock 23 meat	meat
11 poultry 21 dairy	dairy & eggs
14 marine fishing 15 inland fishing	fish
5 sugar cane 20 sugar milling & refining 27 beverages & tobacco	beverages
8 rootcrops 26 other foods	other foods

TABLE 13
Impact of the 1988-1992 Tariff Changes on the Prices of Food and Incomes*
(In percentage change)

	Quintile				
Food Group	**1**	**2**	**3**	**4**	**5**
Cereal	0.00900	-0.00900	0.00900	0.00900	0.00900
Fruit & Veg.	-0.05025	-0.05025	-0.05025	-0.05025	-0.05025
Meat	0.27644	0.27644	0.27644	0.27644	0.27644
Dairy & Eggs	0.16500	0.16500	0.16500	0.16500	0.16500
Fish	-0. 70225	-0.70225	-0.70225	-0.70225	-0.70225
Beverage	0.00525	0.00525	0.00525	0.00525	0.00525
Others	0.08213	0.08213	0.08213	0.08213	0.08213
Income	0.26925	0.25375	0.24050	0.22100	0.21200

*Annual average.

Using equation (7), one can compute the change in the demand for food resulting from price and income changes. Table 14 summarizes the changes in demand for food. The table shows that, as a result of the decline in prices, households increase their demand for most of the food items except for the highest income quintile where only the demand for cereal, fish and other food increases. In addition, quintiles 3 and 4 also show a decline in the demand for cereal.

Finally, using equation (8), one can translate these changes in food demand into calorie and protein availability in households. These are given in Table 15 and Figure 1. The table shows that the 1988-92 tariff reform program is not only progressive in terms of income but even more progressive in terms of macronutrient availability in households. Lower-income households are shown to have a greater increase in both calorie and protein availability.

V. CONCLUSION

This study estimates a system of food demand equations using nationally representative survey data. These estimates were then used to set up a model that can use price and income changes from simulating a general equilibrium model to determine the impact of macroeconomic policy changes on the nutritional status of households. Using the Tariff Reform Program implemented between 1988 and 1992 as the policy change, the study was able to show that there is even a more progressive impact on nutrition compared to the impact on income. This enriches the standard results of simulations using general equilibrium models which stop at the impact on income distribution. This study also demonstrates the feasibility and usefulness of explicitly looking at the likely impact on household decisions of macroeconomic policy changes — a recognized but often glossed-over concern.

TABLE 14
Impact of the 1988-1992 Tariff Changes on the Demand for Food
(In percentage change)

	Quintile				
Food Group	**1**	**2**	**3**	**4**	**5**
Cereal	0.10858	0.11969	-0.03491	0.01975	0.11109
Fruit & Veg.	0.37423	0.26510	0.33873	0.14932	-0.00960
Meat	-0.10202	-0.49503	.0.36612	-0.38759	-0.41136
Dairy & Eggs	0.16294	0.11153	-0.08707	-0.18405	-0.34423
Fish	1.01397	0.99083	0.89168	0.73210	0.69289
Beverage	0.64994	0.54415	0.58342	0.35311	0.06117
Others	0.10079	0.13786	0.16825	0.18919	0.16978

TABLE 15
Impact of the 1988-1992 Tariff Reform on the Nutrition of Households
(In percentage change)

	Quintile				
Nutrient	**1**	**2**	**3**	**4**	**5**
Energy	0.17055	0.15969	0.04375	0.05556	0.09144
Protein	0.09558	0.06022	-0.02447	-0.02453	-0.00429

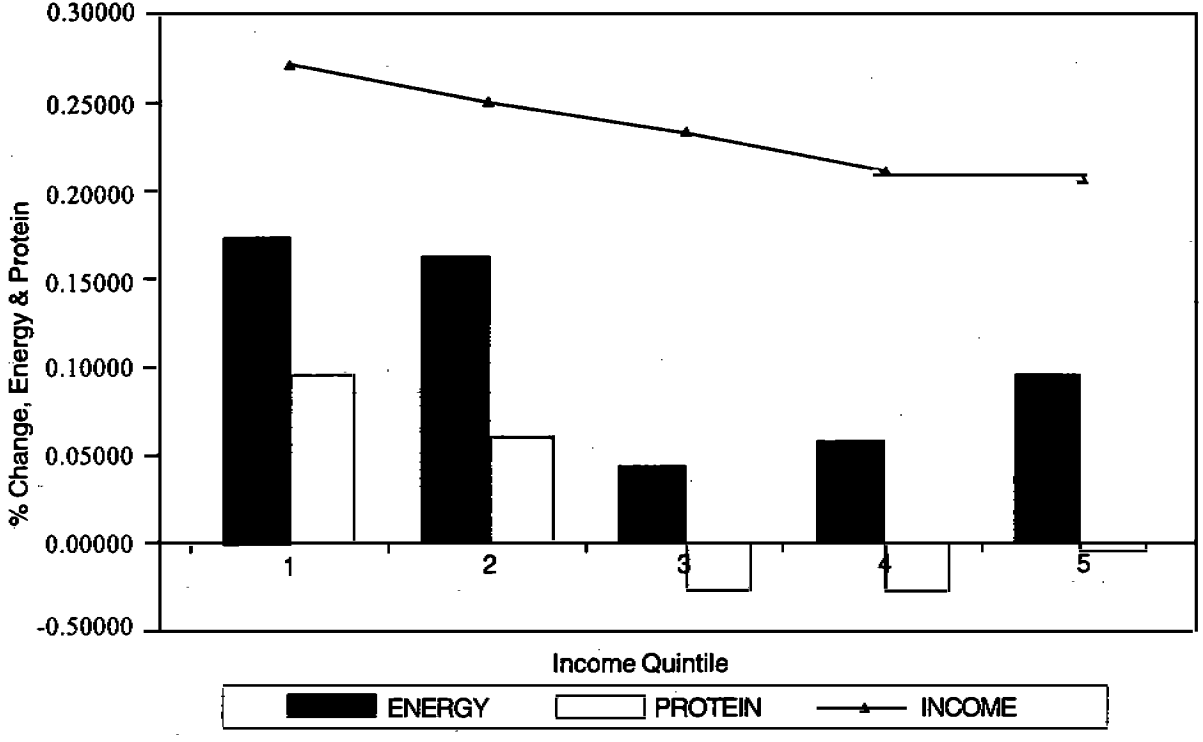

FIGURE 1
Percentage Change in Macro Nutrients & Income Resulting from the 1988-1992 TRP

REFERENCES

Alderman, H. "New Research on Poverty and Malnutrition: What are the Implications for Policy?" In *Including the Poor,* edited by M. Lipton and J. van der Gaag. Proceedings of a symposium organized by the World Bank and the International Food Policy Research Institute, 1993.

Balisacan, A. "Demand for Food in the Philippines: Responses to Income Changes." *Philippine Review of Economics and Business* 31 (1994).

Barten, A. P. "Maximum Likelyhood Estimation of a Complete System of Demand Equations." *European Economic Review* 1 (1969): 7-73.

Belarmino, M.C. "Food Demand Matrix for Different Philippine Income Levels." Ph.D.dissertation, University of the Philippines at Los Baños, 1983.

Blundell, R.; P. Pashardes; and G. Weber. "What Do We Learn About Consumer Demand Patterns from Micro Data?" *American Economic Review* 83 (1993): 570-97.

Bouis, H. "Demand for Cereal Staples in the Philippines." Paper presented at the Rice Policies in Southeast Asia Project Workshop, Jakarta, August, 1982.

———. "Food Demand Elasticities By Income Group By Urban and Rural Populations for the Philippines" in Rosegrant M. and L. Gonzales.

Canlas, D. "Estimating Price and Income Elasticities of the Demand for Food: The Philippines 1965." Paper presented during the Nutrition Symposium Seminar Series, UP School of Economics, July 1983.

Cororaton, C. "Simulating the Income Distribution Effects of the 1988-1992 Tariff Reduction Using the APEX Model." PIDS Discussion Paper Series No. 96-01,1996.

———. "Review and Assessment of Some Philippine CGE Models." Paper presented at the First Technical Workshop of the MIMAP Project Phase III, February 17-18, 1994.

Deaton, A., and J. Muellbauer. "Almost Ideal Demand System." *American Economic Review* 70 (1980): 312-26.

Florentino, R.; G. Vilavieja; W. Molano; B. Raymundo; and R. D. Lana. "Contribution of Major Food Items on Caloric and Protein Intake of Filipinos." Paper presented at the Technical Workshop of the Micro Impact of Macro Adjustment Policies Project, Punta Baluarte, Calatagan, Batangas, April 11-12,1996.

Food and Nutrition Research Institute (FNRI). *First Nationwide Nutrition Survey, Philippines, 1978.* (Summary Report), 2nd revision, 1981.

FNRI. *Second Nationwide Nutrition Survey, Philippines, 1982.*

Huang, J., and C. David. "Demand for Cereal Grains in Asia: The Effect of Urbanization." *Agricultural Economics* 8 (1993): 107-24.

Johnston, J. *Econometric Methods.* New York: McGraw-Hill Book Company, 1984.

Lamberte, M.; G. Llanto; and A. Orbeta. "Micro Impacts of Macroeconomic Adjustment Policies (MIMAP): Phase II Integrative Report." PIDS Working Paper Series 92-31, 1992.

Llanto, G. "Philippine Households' Response to Price and Income Changes." Paper prepared for the Food and Agriculture Organization, 1996.

Luch, C.; A. Powell; and R. A. Williams. *Patterns in Household Demand and Savings.* Oxford University Press, 1977.

Ministry of Agriculture Integrated Agricultural Production and Marketing Project (MA-IAPMP). 1980.

Orbeta, A. "Towards a Model for Analyzing the Impact of Macroeconomic Adjustment Policies on Households: A Review of Empirical Household Models in the Philippines." PIDS Discussion Paper Series No. 94-05, 1994.

Pante, F., Jr. "Consumer Demand Functions: An Empirical Evaluation of Alternative Functional Form." Ph.D. dissertation, University of the Philippines, 1977.

Quisumbing, A. "Estimating the Distributional Impact of Food Market Intervention on Policies on Nutrition." Ph.D. dissertation, University of the Philippines, 1985.

Quisumbing, M. A. et al. "Flexible Function Form Estimates for Philippine Demand Elasticities for Nutrition Simulation." PIDS Working Paper Series No. 88-13, Makati, 1988.

Regalado, B. M. "The Distributional Impact of Food Policies in the Less-developed Countries: The Case of the Philippines." Master's thesis, University of the Philippines at Los Baños, 1985.

San Juan, E. "A Complete Demand Model for the Philippines." Master's thesis, UPLB, 1985.

Snell, J. "Estimating Demand Parameters from Secondary Data: Problems and Pitfalls - A Philippine Case." *Journal of Agricultural Economics and Development* 10 (1980): 201-19.

Stone, J. R. *The Measurement of Consumer's Expenditure and Behaviour in the United Kingdom, 1920-1938,* Vol. I, Cambridge University Press, 1953.