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NOTE ON
FOOD DEMAND PARAMETERS IN BANGLADESH

by

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1. Introduction

The purpose of this note is to clarify the methodology and the conclusion of a study[1] of food demand parameters in Bangladesh conducted using data from the Household Expenditure Survey (HES) 1988/89 collected by the Bangladesh Bureau of Statistics.

Food demand parameters were estimated for 9 groups of commodities: rice, wheat, pulses, fish, meat, vegetables, oils, spices, and sugar. The data were compiled by BBS and made available to IFPRI. They referred to 5675 households, distributed in both rural and urban areas; food consumption was recorded for over 200 commodities.

2. Methodology

Given the difficulty of getting an index of non food prices, it was decided to use a formulation of food demand based only on food prices, income, and household characteristics of the household. Income was proxied by expenditures deflated by a Stone index constructed by weighing each price with the share of that commodity in the total expenditure. Household characteristics included in the specification of the model are family size, percentage of children aged 0 to 7, percentage of adults, sex of household head, percentage of employed members of the household, percentage of household members employed within the household, education of the household head.

The presence of many observations with a value of zero consumption is pervasive in HES 1988/89 as pointed out by table 1. Wheat has 43 percent of observations with zero values.

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[1]Goletti Francesco. 1993. "Food consumption parameters in Bangladesh", International Food Policy Research Institute, Washington, D.C.

Even after aggregating food commodities, a substantial number of zero observations remains, especially for meat, sugar,and pulses.

When zero observations are present, the application of the usual continuous techniques such as OLS would result in biased and inconsistent estimation, because the random disturbances have non zero means and are correlated with the exogenous variables.

The limited dependent variable model of Tobin provides a method for estimating demand equations in this case since it permits a positive probability of observing zero consumption.

A specification with enough flexibility adapted from Pitt[2] was estimated with Tobit method. The parameters were estimated separately for each quartile, and for both urban and rural areas.

3. Conclusions

The results of the analysis are reported only for demand parameters of rice and wheat (see table 2). The complete elasticity matrix for the nine food groups are available in Goletti 1993.

First, as income grows, *expenditure elasticities of rice decline* according to Engel's law. Moreover, they are higher in rural areas than in urban areas. For wheat the behavior is different; income elasticities are not statistically different from zero for most of the groups considered, except poor rural households, for whom the elasticity is negative. This suggests that wheat is an inferior good for rural population, whereas for urban areas the claim that wheat is a superior good could not be supported by the data. Only considering a more disaggregated analysis of flour and wheat in major cities, it would be possible to have a better understanding of this issue.

Second, *most commodities are price responsive*. The percentage of significative own price elasticities and cross price elasticities is very high both in urban and in rural areas. The significance of price coefficients has been referred to as the pervasiveness of price response of

[2]Pitt, Mark. 1983. "Food preferences and nutrition in rural Bangladesh", The Review of Economics and Statistics, Vol. 65, February 1983, pp. 105-114.

food consumption. For important commodities, such as rice and wheat the price response in urban areas is higher than in rural areas.

Third, the *cross price elasticities* of wheat have very high values. Wheat prices do not have any significant effect on rice demand. On the contrary, rice prices affect wheat demand very strongly. The cross price elasticity between wheat and rice is declining with income, an indication of lower substitution effects between rice and wheat at higher income levels.

Fourth, *price and expenditure response changes significantly across expenditure groups.* Moreover, the hypothesis of higher price response for lower income groups could not be rejected for some important commodities such as rice, and wheat.

Finally, *calorie expenditure elasticity* for rural areas is higher than in urban areas. Moreover, as expenditure level grows the price of calories also increases suggesting that both urban and richer households buy more expensive calories, in the attempt to diversify the diet both in terms of food consumed and quality. This suggests that by targeting subsidies to either wheat or to the rice quality consumed by the lower quartiles, significant improvements in calorie intake could be achieved, and therefore have an effective instrument to reduce poverty. Given the recent decline in rice prices relative to wheat prices , the targetting of subsidies to the low qualities of rice is becoming a cost effective way to improve the nutrition status of the poor.

Table 1–Number of zero observations in specific foods and in food groups

Food Name	Number of zero consumption observations	Percentage of total observations	Food Group Name	Number of zero observations	Percentage
RICE	0	0	RICE	0	0
WHEAT	2137	42.6	WHEAT	2137	42.6
RED LENTILS	1234	24.6	PULSES	522	10.4
PIGEON PEAS	2805	55.9			
MUGH	4192	83.5			
DRY PEAS	4640	92.4			
HILSA	2449	48.8	FISH	146	2.9
CATFISH	2762	55			
SOLE	3511	69.9			
PUTI	2265	45.1			
MOLA	2978	59.3			
PRAWN	2080	41.4			
DRY FISH	3159	62.9			
TENGRA	2947	58.7			
BEEF	3648	72.7	MEAT	2869	57.1
MUTTON	4560	90.8			
CHICKEN	4087	81.4			
POTATO	547	10.9	VEGET	53	1.1
BRINJAL	1157	23			
PUMPKIN	3351	66.7			
GOURD	2783	55.4			
POTOL	4191	83.5			
JHINGA	4275	85.1			
PLANTAIN	4054	80.7			
ARUM	3146	62.7			
CAULIF	4039	80.4			
TOMATOES	4112	81.9			
LADY FINGERS	4396	87.6			
MUSTARD OIL	874	17.4	OILS	29	0.6
SOYABEAN OIL	2848	56.7			
GHEE	4671	93			
GREEN CHILI	2030	40.4	SPICES	0	0
RED CHILI	566	11.3			
ONION	216	4.3			
GARLIC	1463	29.1			
TURMERIC	19	0.4			
CARDAMON	2636	52.5			
SUGARS	2990	59.5	SUGARS	1954	38.9
MOLASSES	3170	63.1			

Note: Based on BBS, HES 88/89 sample with 1200-3600 calorie/person/day bounds.

Table 2--Rice and Wheat Elasticities

	Own Price Elasticity		Expenditure Elasticity		Cross Price Elasticity	
	Rural	Urban	Rural	Urban	Rural	Urban
Rice						
Quartile 1	-0.89 *	-1.02 *	0.8 *	0.58 *	0.04	0.26 *
Quartile 2	-0.71 *	-0.76 *	0.71 *	0.43 *	-0.01	-0.18
Quartile 3	-0.55 *	-0.36 *	0.64	0.19	0	-0.05
Quartile 4	-0.39 *	-0.5 *	0.03	-0.03	-0.09	0
All	-0.56 *	-0.59 *	0.39 *	0.15 *	0.01	-0.01
Wheat						
Quartile 1	-1.23 *	-2.79 *	-1.37 *	-0.21	3.14 *	3.91 *
Quartile 2	-0.99 *	-2.49 *	0.05	0.33	2.1 *	3.43 *
Quartile 3	-0.49	-0.86	-1	-0.02	1.31 *	2.03 *
Quartile 4	-0.21	0.94 *	-0.19	0.29	1.88 *	0.34
All	-0.82 *	-1.06 *	-0.44 *	-0.01	2.05 *	2.35 *

Source: Computed by author based on HES data with 1200-3600 calories/person/day.

Note: * indicates elasticities significant at 90% level.