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Consumption Parameters of Selected Starch Food Items in Sri Lanka.

K.H. Dharmasena

Abstract

The objective of this paper is to estimate price and expenditure elasticities of rice, wheat flour and manioc taking into account the endogeneous nature of prices of commodities and the consumers' income. Data were obtained from the reports published by the Department of Census and Statistics and the Central Bank of Sri Lanka for the period of 1960 to 1986. Finite version of the Rotterdam Model was employed for this purpose and the model was estimated using Zellner's Iterative Seemingly Unrelated Regression method.

The study reveal that the partial expenditure elasticity of rice, wheat flour, and manioc are 1.09, 0.25 and o.22 respectively, indicating these commodities as normal food items. Further, it shows that rice is highly responds to change in expenditure or income. Compensated own price elasticities for the same food items are -1.03, -0.38 and -0.80 respectively which suggests that rice is more price responsive compared to others. The cross price elasticities of the same food items indicate that rice and wheat flour are substitutes while manioc is a compliment to both rice and wheat flour.

This study demonstrates the importance of the use of the concept of separability and multi-stage budgeting in demand analysis which leads to consider all the commodities as one set or one braneh of the utility tree instead of individual commodities. In fact, development efforts should be focused to uplift income levels of the consumers because above results lead to conclude that the consumers in Sri Lanka are still poor.

Introduction

Food is the major factor which determine growth and well functioning of the human body. On the basis of calorie intake, about 25 per cent of population in Sri Lanka was below the poverty line (Tilakaratna, 1988). Wasting (inadequacy of weight for height) is about 12 per cent (Government of Sri Lanka, 1988). This is the accumulated result of long term food deprivation. According to the same source, stunting (inadequacy of height for age) is about 36 per cent. This is one of the results of short term food deprivation. Therefore, intake of food in adequate amounts is of vital importance to diminish adverse effects of malnutrition and undernutrition.

Intake of food is determined mainly by prices of food and the consumers income (Mellor, 1966). Hence, change in food prices or consumer's income will results in change in the level of food intake. The responsiveness of food demand (or intake) to change in price and income is measured by price elasticity and income elasticity, respectively. Higher elasticity for a particular commodity implies that small changes of price or income accompany with relatively larger changes of demand. It is evident that low income people are highly response to changes of prices and income (Mellor, 1966). Therefore, when making changes of the food policies, it is important to consider the consumers' response of food demand to price and income changes (Dharmasena, 1990).

Only a few studies were reported on the analysis of consumer behaviour in Sri Lanka (Jogaratnam and Poleman, 1966; De Mel and Jogaratnam, 1977; Edirisinghe and Poleman, 1977; Alderman and Timmer, 1980; and Sahn, 1988). These studies, however, were not much comprehensive and further, they have ignored the endogeneous nature of prices and total expenditure which leads to correlate across equations for the same observation (Koutsoyiannis, 1973). This implies that food demand equations cannot be treated in isolation as a single

equation model, but belong to a system of equations. This system describes the joint dependence of variables. The objective of this paper is to estimate price and expenditure elasticities of rice, wheat flour and manioc incorporating endogenous nature of variables.

Method

Conceptual frame work

Eales and Unnevehr (1988) noted the advantages of separability and multi-stage budgeting in demand analysis. This leads to a hypothesis that the allocation of total expenditure on different commodities takes place in multi-stage. Initially, total expenditure will allocated to broad groups of commodities such as food, shelter, and cloth. Then sub-group expenditure (i.e., food) is further allocated to narrow sub-groups of foods such as starchy food, proteneous food, vegetables and condiments. The narrow sub-group expenditure is then allocated to individual food within a narrow sub-group of food. This shows that expenditure on particular commodity is dependent on sub-group expenditure and prices of foods within a sub-group. Hence, separability and multi-stage budgeting helps to find an explanation for the demand for a particular commodity through much smaller number of commodities and this make analysis simpler and convenient. Further, decision on how to allocate total current expenditure among sub- groups of commodities is independent of the individual commodity. Another advantage of this is that if there is rationed goods, the expenditure needed to buy them can be simply deducted from the total expenditure and the remained can be allocated on the broad groups of commodities independent of the amounts of ration.

Model

The Rotterdam Model (RM) was employed in this study as it has several advantages over the other commonly used demand

models (Linear demand model, Double log demand model, Linear expenditure system, Indirect addilog system, and Almost ideal demand system). The linear demand model gives the elasticities at a point corresponding to an average price and income for the entire period. The double log demand model gives the constant elasticities for the entire period. The linear expenditure system does not eliminate serial correlation, if any, of the data and it does not allow to treat inferior goods in the system (Phlips, 1983). The indirect addilog system has no clear advantages over linear expenditure system (Deaton and Muellbauer, 1980).

RM can be represented as follows (Deaton and Muellbauer, 1980).

$$d(\log q_i) = e_i \, d(\log X) + e_{ij} \sum d(\log P_j) \quad \text{--- (1)}$$

Where: q_i = quantity demanded of i^{th} goods,
e_i = expenditure elasticity of i^{th} good,
X = group expenditure,
e_{ij} = price elasticity of i^{th} good with respect to price of jth good, and
P_j = price of j^{th} good.

An application of Slutsky's decomposition of price change ($e_{ij} = e_{ij} - w_j e_i$) to equation (1) result in:

$$d(\log q_i) = ei \, (d \log X - w_k \sum d \log p_k) + e_{ij} \, d \log P_j \quad (2)$$

Where : w_k = budget share of k^{th} good,
e_{ij} = compensated price elasticity of i^{th} good with respect to price of j^{th} good.

As shown by Deaton and Mullbauer (1980), the symmetry restriction was imposed to the equation (2), multiplying by budget share, w_i. Then equation (2) can be represented as (in natural logarithmic form):

$$w_i \ d \ln q_i = w_i e_i \ (d \ln X - w_k \Sigma d \ln P_k) + w_i e_{ij} \ d \ln P_j \qquad (3)$$

Taking finite changes of variables and the coefficients $w_i e_i$ and $w_i e_{ij}$ are constant over time, equation (3) can be represented as:

$$w_{it} D q_{it} = w_i \ e_i \ (DX_t - \Sigma w_k DP_k) + w_i e_{ij} \Sigma DP_{tj} + U_{it} \qquad (4)$$

$$(i=1,2,3..., N; \quad t=1,2,3,....,T).$$

The operator D represents first difference of variables such as:

Dq_{it} = $\ln q_{it} - \ln q_{i,t-1}$ and

U_{it} = random error term.

Parks (1969) noted that the system of equation (4) is a set of Seemingly Unrelated Regression equations in the sense of Zellner. That is $E\Sigma(Uit) = 0$ for all i and t, and the random error terms are uncorrelated across observations but uncorrelated across observations. Therefore, the system of equations (4) was estimated using Zellner's iterative Seemingly Unrelated Regression method. The respective coefficients were obtained with imposing homogeneity, symmetry, and adding-up conditions for the set of equations in the system.

Data

Information for this study was gathered mainly from the reports published by the Central Bank of Sri Lanka (CBS) and the Department of census and Statistics (DCS) in Sri Lanka. Per capita availabilities of the above food items (in kg.) were collected from the Food Balance Sheets (FBS) from 1960 to 1986 published by the DCS. The prices of the same commodities and the consumer price indexes for the same period were obtained from the Statistical Abstract of the DCS. The 'actual' intake of these food items in 1973, 1987/79 and 1981/82 were collected

from the reports on consumer finance survey (CFS) prepared by the CBS. Per capita availabilities of food items were then convert to actual consumption using the following formula.

$$\text{Conversion Factor} = \frac{\text{amount of ith commodity indicated in CFS in year t}}{\text{amount of ith commodity indicated in FBS in year t}}$$

Results and discussion

Table 1 presents the coefficients matrix with the average budget shares for rice, wheat flour and manioc in 1986. As the price coefficients matrix is symmetric, only the lower triangle is presented to avoid over crowding of the table. The partial expenditure and partial uncompensated price elasticities of rice, wheat flour and manioc are presented in table 2. It shows that uncompensated partial own price elasticities of rice, wheat flour and manioc are -1.03, -0.38 and -0.80, respectively. The signs of own price elasticities are negative as expected and consistent with the theory of consumption. This implies that increase in own prices of these commodities will result in decreasing quantity demanded. Among these, rice is price elastic ($e_{ii} > 1$) while wheat flour and manioc is price inelastic (eii <1). This could be attributed to comparatively higher price of rice which leads to higher responds to change in price.

Table: 1 Coefficients of the Restricted Rotterdam Model for Starch Food

Commodity	Expenditure	Rice	Wheat Flour	Manioc
Rice	0.9710	-0.0529		
Wheat Flour	0.0243	0.0349	-0.0338	
Manioc	0.0047	0.0180	-0.0011	-0.0169
Average Budget Share in 1986		0.8840	0.095	0.0210

Table 2: Partial Expenditure and Uncompensated Partial Price Elasticities of the Restricted Rotterdam Model for Starch Food.

Commodity	Partial Expenditure Elasticity	Uncompensated Partial Price Elasticity		
		Rice	Wheat Flour	Manioc
Rice	1.0980	-1.0300		
Wheat Flour	0.2585	0.0150	-0.3830	
Manioc	0.2238	-0.1170	-0.0320	-0.8090

A positive cross price elasticity of rice with what flour indicates that these two commodities are substitutes. It is reasonable to have positive cross price elasticities for these two food items since they are generally regarded as substitute goods among Sri Lankan consumers. Further, it is interesting to have negative cross price elasticities for manioc with rice and wheat flour. This implies that manioc is a compliment to both rice and wheat flour. This is probably due to the fact that most consumers in Sri Lanka prepare manioc also as a curry. Shan (1988) obtained a similar results that is rice and wheat flour are compliments to root crops. However, it is worthy to note that the results of Sahn are based on cross section data and further he used all root crops as one commodity.

The partial expenditure elasticities of rice, wheat flour and manioc are 1.09, 0.25 and o.22, respectively. Among these, expenditure elasticity of rice is well above one which can be expected from the poors. The positive signs of these elasticities corresponds to expectations and also consistent with the theory of consumption.

Conclusions and policy implications

Findings of this study demonstrate that rice, wheat flour and manioc are normal food items. Moreover, rice and wheat

flour are substitutes while manioc is a compliment to both rice and what flour. Further, the demand for rice is highly responsive to change in its own price than that of wheat flour and manioc.

The higher expenditure elasticity and price elasticity for rice is expected from the low income groups. Further, the positive expenditure elasticity for manioc and its complimentary nature is also expected from the same income groups. Therefore, this results suggest that the consumers in Sri Lanka are still poor.

The present employment generation schemes which are either underway or planned coupled with other development activities in the country will lead to increase income of the people especially of the poors. This may eventually leads to increase aggregate demand for food. This in turn caused to higher food prices if there is no corresponding increase in the supply.

As hypothesized in the study, rice and wheat flour are substitutes. Therefore, quantity demanded of one commodity is depend not only on its own price and consumers income but also price of the other commodity. When there are more substitutes, price decreased of one commodity will result in higher demand for the same. Therefore, price reduction of a particular commodity, which can be easily produced in the country, helps to promote local infant industries and to reduce the need of foreign exchange to import food. Hence, it is important to consider all the commodities as one set or one branch of utility tree instead of individual commodities.

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