HABIT FORMATION IN CONSUMPTION: A Case Study of Rural India

by Puja Guha

ABSTRACT

Dependence of present consumption over the past levels' was first proposed by Polak (1970). Since then many extensive studies have been done to test the presence of habit-forming effects in food and non-food commodities in the context of many different countries. But no such formal analysis has been done with Indian data. This paper examines the habit-forming effects in the context of rural India – considering rural parts of 4 Indian States Punjab, Gujarat, West Bengal and Tamil Nadu. The demand system used is the flexible AIDS model incorporating demography. It is found that habit effects are significant for all states considered.

TABLE OF CONTENTS

1. Introduction 4

2. Literature Review 5

3. Model and Estimation 6

4. Empirical Results 10

5. Conclusion 14

6. Tables 15

I. Introduction

Studies have shown that past consumption patterns are an important determinant of present consumption. As suggested by Polak (1970), this persistence in consumption pattern can arise out of 3 reasons:

1. The consumer may have contractually fixed commitments, which prevent him from adjusting, some proportion of his consumption with change in prices or income.
2. The consumer may be ignorant of consumption possibilities or of his own tastes outside the range of his past consumption experience.
3. Goods may be **habit forming** so that an individual's current preferences depend on his past consumption pattern.

In literature, 2 kinds of habit formation in consumption have been defined – '*MYOPIC*' and '*RATIONAL*'.

In myopic habit formation the consumer takes into account only his consumption in the past and does not recognize the impact of the present consumption on future taste. Thus in this case the utility function retains the property of addivity and can be estimated by 2-stage budgeting, where in the first stage consumer determines total expenditure in each period and in second stage allocates expenditure to different categories of commodities.

In case of rational habit formation consumer takes into account both forward as well as backward consumption patterns. In this case individual plans his consumption in a time consistent way and utility function is not separable. Hence two stage budgeting rule is not longer valid.

AIDS Model originally developed by Deaton and Muellbauer (1980) is a static model. It does not consider these habit effects. The purpose of this paper is to explicitly include habit effects into AIDS model and make it dynamic. This paper aims to examine whether habit formation affects the consumption pattern of rural India. The data used for the

analysis is of the rural parts of 4 Indian states – Punjab, Gujarat, Tamil Nadu and West Bengal.

Section 2 of the paper gives a brief literature survey done on various theories of Habit Formation. Section 3 describes the model specification and estimation procedure. Empirical results of both static and dynamic model for 9 commodities, using data for 4 rural states of India – Punjab, Gujarat, West Bengal and Tamil Nadu, are stated in Section 4 of the paper. Finally Section 5 concludes the paper. Estimation tables are given in Section 6.

II. Literature Review

Many studies have been performed to examine the effect of habit in consumer demand behavior. In most of the literature habit effects are incorporated through introduction of a lagged dependent variable.

Habit effects were first introduced into complete demand system by *Polak and Wales (1969).*In one of the studies done by *Polak (1970)*, he incorporated habit effects in Linear Expenditure System (LES) by assuming that 'the necessary quantity of each good is proportional to consumption of that good in the previous period'. The essence of his habit formation analysis is that:

i. Past consumption influences current preferences and hence current demand, and
ii. That a higher level of past consumption of a good implies, cet par, a higher level of present consumption.

In another study performed by *Blanciforte and Green (1983)*, they made Almost Ideal Demand System (AIDS) dynamic by incorporating habit effects; the homogeneity and symmetry restrictions which were rejected by Deaton and Muellbauer are tested with more dynamic generalizations. They accepted the hypothesis of presence of habit effects

in consumption. Moreover the large autocorrelation found in the AIDS model can be correlated by rightly specifying the model by incorporating habits.

In one of the earlier works done by *Polak (1976)*, he incorporated linear interdependence in the context of LES by postulating that necessary quantities depend linearly on other people's past consumption.

Allesie and Kapteyn in their study incorporated both habit formation and interdependent preferences in AIDS. They proceeded by calculating a mean perceived budget share representing interdependent preferences and further incorporate a lagged mean perceived budget share as independent variable.

In a recent study done by *Kapteyn, Geer and Wansbeek (1997)*, they have incorporated interdependent preferences in LES model. They have based their study on only cross section data, a dynamic specification is ruled out.

The result of both the above studies confirm the suspicion that preference interdependence is an important determinant of consumer behavior, not so much for an extra variance in consumption which can be thus explained nor for the parameter estimates, but certain conclusion from the model do change rather substantially if preference interdependence is accounted for.

III. Model and Estimation

Though many studies have been done on habit formation and interdependent preferences, no detailed analysis has been done in the Indian context. In my study, I aim to examine the effect of habit formation in consumption, in context of 4 rural states of Indian – Punjab, Gujarat, West Bengal and Tamil Nadu.

The data used in the study include:

Commodities – Expenditure and prices of following commodities:

1.Cereal

2.Pulse and Pulse product

3.Milk and Milk product

4.Edible Oil

5.Meat Egg, Fish

6.Other foods

7.Clothing and Footwear

8.Fuel and Lights

9.Other Non-food items

Demographic variables –

1. Household size

2. Number of female adults

3.Number of male adults

4.Number of children.

Time Period of the data ranges over 4 quartiles from 1972-73 to 1987-88: 1972-73, 1977-78, 1983-84, and 1987-88.

In case of a Linear Expenditure System expenditure on a good is a linear function of prices and income. This model is theoretically consistent but is based on restrictive assumption of additive preferences, which is unrealistic in empirical use. Further, additive preferences rule out inferior goods.

ALMOST IDEAL DEMAND SYSTEM

An Almost Ideal Demand System (AIDS) on the other hand overcomes these limitations by assuming non-separable utility function and a flexible cost function. AIDS gives first an arbitrary first order approximation to any demand system. It satisfies the consumer choice axioms and aggregates perfectly over consumers without giving rise to parallel linear Engel Curve. Moreover, it is simple to estimate and the restrictions of symmetry and homogeneity can be tested.

The AIDS model is a time series generalization of a Price generated generalized log-linear (PIGLOG) function. PIGLOG cost function associated with AIDS Model :

$$\text{Log } C(\mathbb{P},u) = \log a(\mathbb{P}) + u \log b(\mathbb{P})$$

Where u is specified utility level and $a(\mathbb{P})$ and $b(\mathbb{P})$ are positive linear homogeneous function of prices and interpreted as costs of subsistence and bliss respectively.

$$\log a(\mathbb{P}) = \alpha_0 + \Sigma\alpha_i \log p_j + \Sigma_i\Sigma_j\gamma^*_{ij} \log p_i \log p_j$$

$$\log b(\mathbb{P}) = \beta_0 \Pi p_j^{\beta k}$$

where α, β, γ are parameters.

Budget shares can be derived from the cost function as $w_i = \delta\log c/\delta\log p_i$

Therefore, AIDS model in the budget share form is given as :

$$w_i = \alpha_i + \Sigma\gamma_{ij} \log P_j + \beta_i [\log y - \log a(\mathbb{P})]$$

where $\gamma_{ij} = \frac{1}{2}(\gamma^*_{ij} + \gamma^*_{ji})$

Thus the above equation shows relation between budget shares and income and prices.

To get the 'Ideal' demand system we impose certain restrictions on the parameters:

Adding Up: $\Sigma\alpha_i = 1$, $\Sigma\beta_i = 0$, $\Sigma\gamma_{ij} = 0$

Homogeneity: $\Sigma\gamma_{ij} = 0$

Symmetry : $\gamma_{ij} = \gamma_{ji}$

Restrictions on α_i and β_i ensure that $a(\mathbb{P})$ is linearly homogeneous function of individual prices. Thus we approximate $a(\mathbb{P})$ as the price index given by $a(\mathbb{P}) = \Sigma w_k \log P_k$

Elasticities calculated from AIDS Model:

Income Elasticity : $e_i = 1 + \beta_i / w_i$

Own Price Elasticity : $\eta_{ii} = w_i^{-1} [\gamma_{ij} - \beta_i (\alpha_i + \Sigma\gamma_{ij} \log p_j)] - 1$

β_i parameters of AIDS determine whether goods are 'Luxury' or 'Necessity'. When $\beta_i > 0$, w_i increases with income. So good is luxurious. When $\beta_i < 0$, w_i decreases with increase income. So good is necessity. γ_{ij} measures the change in the i^{th} budget share following a unit proportional change in p_j with $y/a(\mathbb{P})$ held constant.

We extend the AIDS model by incorporating demographic variables using 'Translation'. We allow the α_i to depend on demographic variables.

$w_i = \alpha_{0i} + \alpha_{1i} Z + \Sigma\gamma_{ij} \log P_j + \beta_i [\log y - \log a(\mathbb{P})]$

Where Z is the demographic variable.

AIDS WITH HABIT FORMATION

The above formulation represents the static version of AIDS. AIDS model can be made dynamic by incorporating habit formation in the model. This is done by extending the original model by specifying α_i as a linear function of previous consumption levels.

i.e. $\alpha_i = \alpha_i^{*} + \alpha_i^{**} q_{it-1}$

This linear habit scheme follows the approach of Pollak and Wales (1969).

α_i^{**} is the habit formation coefficient. The linear function of habit formation can be divided into 2 parts - α_i^{*} can be interpreted as a "physiologically necessary" component whereas $\alpha_i^{**} q_{it-1}$ is the "psychologically necessary" component.

$\alpha_i^{**} > 0$ implies past consumption influences current consumption of a good, cet par, and higher levels of past consumption implies higher levels of present consumption.

By substituting the above in AIDS equation we get the 'Dynamic' Version of AIDS.

$$w_i = \alpha_i^{*} + \alpha_i^{**} w_{it-1} + \Sigma\gamma_{ij} \log P_j + \beta_i [\log y - \log a(\mathbb{P})]$$

where $\gamma_{ij} = \frac{1}{2}(\gamma^{*}_{ij} + \gamma^{*}_{ji})$

For a comparison between simple AIDS and AIDS with habit formation, we use log **likelihood ratio test** for nested model. The test statistics for the test is given as:

$$-2\ln = \chi 2 \qquad \text{where } \lambda = L_r/L_u$$

IV. Empirical Results

We estimate both demographically extended AIDS without habit formation and demographically extended AIDS with habits for aggregate commodities for rural parts of

4 states – Punjab, Gujrat, West Bengal and Tamil Nadu, using non-linear estimation process. The results for each state is as follows:

TAMIL NADU

The log likelihood values for simple AIDS and AIDS with habit formation in case of Tamil Nadu is given in Table (3). The log likelihood function for simple AIDS model is 820.8749 and for AIDS with Habit Formation it is 945.5334. Performing the log likelihood test for nested model, we conclude that null hypothesis of no habit formation is rejected. Hence Tamil Nadu show the presence of habit formation in consumption.

Coefficients of habit formation Table(2) are significant for commodities cereal; meat,egg and fish; other food; and all non-food items. Thus out of 6 food items only 3 are habit forming whereas all non-food items are habit forming.

In simple AIDS all commodities are luxurious goods (Table1). Incorporating habit causes 2 commodities to become necessities – cereal and other food item; others remain luxury (Table2).

In case of demography variables, all demography variables are significant. With incorporation of habit causes some variables to become insignificant. But demography remains to be an important component.

PUNJAB

The log likelihood function for AIDS and AIDS with Habit is given in Table (6). Log Likelihood function for simple AIDS is 850 and that for AIDS with Habit is 854. Thus by log likelihood test we can say that by incorporating habit, AIDS with Habit performs better than simple AIDS.

Coefficient of habit formation is significant for pulses (Table 5). But pulses has a negative habit effect i.e. for a high past pulses consumption, there will be less present consumption.

Commodities cereal, pulses, edible oil, fuel are luxury whereas all others are necessity (Table 4). This remains same even after incorporating habit effects in the model. Income elasticities change marginally in the dynamic framework when compared to the static framework (Table 6).

Demography variables are more or less significant before and after habit formation.

WEST BENGAL

The log likelihood values for AIDS and AIDS with Habit are given in Table (9). Log Likelihood for simple AIDS is 1018.47 and that for AIDS with Habit is 1038. Thus Habit formation hypothesis is accepted for West Bengal.

Habit coefficients for cereal; meat, egg & fish; clothing and fuel are significant, with meat, fish & egg showing negative habit effects (Table 8).

Commodity cereal, pulse, edible oil and other food are luxury whereas all others are necessity (Table 7). This remains same even when we incorporate habit (Table 8).

GUJARAT

Log likelihood values for Gujarat is given in Table (12). The value of log Likelihood for simple AIDS is 902.36 and for AIDS with Habit is 915.25. From the likelihood ratio test for nested model we reject the null of no habit formation and accept habit formation in Gujarat.

The habit-forming coefficients are significant for all food commodities. Out of the non-food commodities, only fuel and lighting are habit forming (Table 11).

In simple AIDS model only pulses and clothing & footwear were necessity; the rest were luxury (Table 10). When habit effects are incorporated, clothing & footwear become luxury and fuel and lighting become necessity (Table 11).

ALL INDIA COMPARISON

Table (13) shows statewise habit forming commodity. Out of 4 states considered, Tamil Nadu and Gujarat has prominent habit forming effect – Tamil Nadu has habit formation mostly in all non-food items whereas Gujarat has habit formation in all food items.

Out of the 5 food commodity considered, cereal has a marked habit forming effect in all states, except Punjab. The same is true for meat, fish & egg.

If we compare Punjab with Tamil Nadu, we observe that South India shows greater tendency of habit formation in commodities than North India. Similarly, for West Bengal and Gujarat, habit forming effects are more predominant in case of Gujarat than West Bengal.

Such Habit formation effect for different states can be explained by studying the consumption pattern and substitution possibilities in each State. Cereal being the staple food of Tamil Nadu, habit formation of cereal is evident in Tamil Nadu. High habit formation in non-food items in Tamil Nadu suggest that with the rise in per capita income, people tend to indulge in consumption of commodities other than food. This kind of habit formation reflects the divergence of consumption pattern in rural Tamil Nadu.

In Punjab habit formation effects are not marked. Punjab is one of the wealthiest States of India and is majorly an agricultural State. Thus substitution possibilities for commodities – both food and non-food - are quite high. Given the luxurious lifestyle lead by people of Punjab, it is difficult to form habit of a particular commodity.

In case of Gujarat, all food commodities are habit forming. Out of the non-food items, Fuel and Lighting is habit forming. Gujarat being an industrial state, demand for energy

is ever increasing. With the industries primarily located in the rural parts, rural demand for electricity is high.

In case of West Bengal, habit formation in cereals can be explained in same way as that of Tamil Nadu – cereal forms a major part of their diet, Moreover, WB is the largest producer of rice and wheat.

ELASTICITY

In case of elasticities, Income Elasticity decrease when habit is incorporated in case of Tamil Nadu and Punjab. This can be attributed to the fact that when a good is habit forming, changes in income doesn't affect the consumption of the good in the same way as in the absence of habit effects.

Price elasticity also decreases when habit effects are incorporated, more so for habit forming commodities. This is due to the fact that for a habit forming commodity, substitution possibility is less. Thus such commodities are less sensitive to changes in their price level or income.

V. CONCLUSION

In this paper we examined habit-forming effects for 9 commodities in case of rural parts of 4 Indian States using AIDS model. The empirical results show that habit formation hypothesis are accepted for all States and it is predominant in case of North and West India when compared with the Southern and Eastern India.

Thus it can be concluded that in general habit-forming effects are significant and plays an important role in determining future consumption level. Hence such effects should be incorporated while estimating demand systems.

TABLES

PARAMETER ESTIMATES of BUDGET SHARES, OWN PRICE AND HABIT COEFFICIENTS

TAMIL NADU

1. SIMPLE AIDS (Values in the parenthesis are t-ratios)

Commodities	β_i	γ_{ii}	**ELASTICITIES**	
			Income	**Own-Price**
Cereal	1.2123	0.86707	3.23	-0.6171
	(2.6743)	(3.0011)		
Pulse	1.0607	1.791	41.0	65.48
	(4.4349)	(1.8391)		
Edible Oil	1.0419	0.77212	43.4	29.31
	(4.3516)	(0.55137)		
Meat, fish, Egg	0.94454	-0.79843	39.3	6.95
	(3.8804)	(-0.84985)		
Other Foods	1.4727	0.21376	11.95	-2.63
	(4.6879)	(0.24039)		
Clothing & Footwear	0.79849	-1.7339	3.4	-2.54
	(2.5468)	(-2.4727)		
Fuel & Lighting	1.2728	1.7177	10.81	-0.310
	(4.255)	(1.7882)		
Other Non-foods	6.49E-02	0.11709	1.57	0.968
	(0.16042)	(0.12592)		

2. AIDS (HABIT) (Values in the parenthesis are t-ratios)

Commodities	αi	β_i	γ_{ii}	ELASTICITIES	
				Income	Own-Price
Cereal	0.27867	-0.34603	1.4816	0.36	2.07
	(3.9684)	(-1.1198)	(10.017)		
Pulse	-0.10695	0.17507	6.2468	7.60	234.41
	(-0.96217)	(1.1792)	(8.1807)		
Edible Oil	-4.53E-02	9.98E-02	2.1215	5.05	85.06
	(-0.35139)	(0.73304)	(2.7641)		
Meat, fish, Egg	0.5186	0.10795	-1.4842	5.38	-61.39
	(4.0329)	(0.71862)	(-1.8498)		
Other Foods	0.17898	0.30932	-0.57906	3.30	-5.61
	(2.238)	(1.2592)	(-0.70255)		
Clothing & Footwear	0.22823	0.58575	-1.1083	11.49	-
	(2.0108)	(3.2333)	(-1.8546)		
Fuel & Lighting	0.42755	3.23E-02	0.43141	1.24	2.29
	(4.9364)	(0.18367)	(0.46922)		
Other Non-foods	0.23753	-0.71532	0.53892	-5.34	4.49
	(2.1742)	(-2.388)	(0.5903)		

3. LOG LIKELIHOOD VALUES

AIDS	AIDS(H)
820.8749	945.5334

PUNJAB

4. SIMPLE AIDS (Values in the parenthesis are t-ratios)

Commodities	β_i	γ_{ii}	**ELASTICITIES**	
			Income	**Own-Price**
Cereal	2.6555	1.6961	26.18	12.4
	(5.5667)	(1.9508)		
Pulse	0.42382	0.74226	1.42	-
	(2.209)	(0.80507)		
Edible Oil	0.78185	0.5627	15.98	9.00
	(4.9386)	(0.64924)		
Meat, fish, Egg	-0.15094	4.3938	-	-
	(-1.2252)	(4.2129)		
Other Foods	2.5964	0.24579	6.45	-1.62
	(7.6923)	(0.26537)		
Clothing & Footwear	-2.0392	-1.2962	-	7.28
	(-2.8624)	(-1.5727)		
Fuel & Lighting	0.93842	0.21072	5.64	-15.93
	(3.208)	(0.34755)		
Other Non-foods	-5.1187	-0.35728	-30.64	-13.415
	(-6.7973)	(-0.49529)		

5. AIDS (HABIT) (Values in the parenthesis are t-ratios)

Commodities	αi	β_i	γ_{ii}	ELASTICITIES	
				Income	Own-Price
Cereal	4.19E-02	2.5602	0.75296	26.18	12.43
	(0.68708)	(5.1228)	(0.87594)		
Pulse	-0.27667	0.39115	0.43761	1.42	-
	(-3.0846)	(3.6544)			
Edible Oil	-1.22E-02	0.82904	0.31638	15.98	9.00
	(-0.14638)	(8.8679)	(0.36764)		
Meat, fish, Egg	0.15767	-0.13362	4.6996	-	-
	(1.306)	(-3.5549)	(6.1989)		
Other Foods	4.53E-02	2.7063	7.36E-02	6.45	-1.61
	(0.63407)	(8.73)	(7.98E-02)		
Clothing & Footwear	3.11E-03	-2.6005	-2.2346	-27.3	7.28
	(3.07E-02)	(-5.5243)	(-2.8568)		
Fuel & Lighting	-5.92E-02	0.95212	1.3008	5.64	-15.93
	(-1.1608)	(4.8899)	(2.1027)		
Other Non-foods	-5.22E-03	-4.5866	-0.28069	-30.60	-13.41
	(-7.60E-02)	(-6.5916)	(-0.39295)		

6. LOG LIKELIHOOD VALUES

AIDS	AIDS(HABIT)
850.1984	854.0627

WEST BENGAL

7. SIMPLE AIDS (Values in the parenthesis are t-ratios)

Commodities	β_i	γ_{ii}	ELASTICITIES	
			Income	Own-Price
Cereal	0.28886	0.57685	1.43	-0.42
	(1.5569)	(0.90239)		
Pulse	3.72E-02	3.332	4.10	277.56
	(2.0176)	(4.4469)		
Edible Oil	9.94E-02	4.4148	4.17	140.04
	(4.7712)	(5.142)		
Meat, fish, Egg	-0.21728	1.2419	-10.24	-8.19
	(-3.9603)	(1.9087)		
Other Foods	0.20072	-1.2802	2.78	1.86
	(4.5883)	(-1.5202)		
Clothing & Footwear	-8.74E-02	1.1104	-9.56	0.83
	(-1.2219)	(1.4621)		
Fuel & Lighting	-3.00E-02	-0.50953	0.62	-1.50
	(-0.53111)	(-0.66706)		
Other Non-foods	-0.4232	0.3662	-5.38	-2.25
	(-3.5469)	(0.49452)		

8. AIDS (HABIT) (Values in the parenthesis are t-ratios)

Commodities	α_i	β_i	γ_{ii}	ELASTICITIES	
				Income	Own-Price
Cereal	0.11563	0.33997	0.44977	1.43	-0.425
	(2.5202)	(3.2523)	(0.70316)		
Pulse	-6.44E-02	2.17E-03	1.9715	4.10	277.56
	(-0.49182)	(0.18588)	(2.3655)		
Edible Oil	-1.08E-02	4.53E-02	1.7813	4.17	140.04
	(-4.65E-02)	(2.0011)	(1.9885)		
Meat, fish, Egg	-0.26747	-0.15919	0.90365	-10.24	-8.19
	(-3.38)	(-3.1472)	(1.3864)		
Other Foods	0.13703	0.1129	0.69235	2.78	1.86
	(1.4803)	(3.7197)	(0.79418)		
Clothing & Footwear	0.27238	-3.00E-02	0.25636	-9.56	-1.50
	(4.219)	(-0.52933)	(0.32463)		
Fuel & Lighting	0.43841	-2.95E-02	1.2803	0.62	-2.25
	(7.1568)	(-0.76467)	(1.6609)		
Other Non-foods	-6.69E-02	-0.38626	0.15494	-5.38	-
	(-0.78207)	(-3.7368)	(0.20761)		

9. LOG LIKELIHOOD VALUES

AIDS	AIDS(HABIT)
1018.476	1038.097

GUJRAT

10. **SIMPLE AIDS (**Values in the parenthesis are t-ratios)

Commodities	β_i	γ_{ii}	**ELASTICITIES**	
			Income	**Own-Price**
Cereal	0.91725	0.5498	2.65	-0.92
	(1.8281)	(0.64684)		
Pulse	-9.86E-02	0.99377	-2.45	33.91
	(-1.5152)	(1.5173)		
Edible Oil	-0.22225	2.1439	-3.40	41.73
	(-1.97)	(4.6842)		
Meat, fish, Egg	2.23E-03	-3.5265	2.17	1378
	(4.46E-02)	(-2.0864)		
Other Foods	-1.74E-02	1.2727	0.87	3.23
	(-0.1045)	(1.2539)		
Clothing & Footwear	-0.17398	-1.3803	-	0.699
	(-0.64077)	(-1.4614)		
Fuel & Lighting	6.57E-02	1.3721	1.683	3.179
	(0.4821)	(1.7758)		
Other Non-foods	-0.34055	-0.96373	-3.36	4.056
	(-1.5519)	(-1.0487)		

11. AIDS (HABIT) (Values in the parenthesis are t-ratios)

Commodities	α_i	β_i	γ_{ii}	ELASTICITIES	
				Income	Own-Price
Cereal	0.17155	1.8991	1.1481	4.42	-0.829
	(2.0541)	(4.2661)	(1.649)		
Pulse	0.22119	-3.45E-02	0.75024	-0.209	25.31
	(1.822)	(-0.90165)	(1.7644)		
Edible Oil	0.25907	-0.27748	1.4003	-4.50	27.04
	(2.6706)	(-4.6238)	(2.8147)		
Meat, fish, Egg	4.6349	7.97E-02	-2.4495	42.85	-1288
	(4.9789)	(1.6243)	(-2.8423)		
Other Foods	0.22227	-0.2726	0.79347	-1.03	5.187
	(2.8389)	(-1.7715)	(0.87598)		
Clothing & Footwear	0.19313	6.19E-02	-0.39454	-	-
	(1.3433)	(0.27832)	(-0.47228)		
Fuel & Lighting	0.56441	-0.19345	0.43704	-1.01	3.74
	(5.4227)	(-2.0729)	(0.57009)		
Other Non-foods	9.91E-02	-0.45904	1.6445	-4.88	20.53
	(1.2886)	(-3.0936)	(1.8027)		

12. LOG LIKELIHOOD VALUES

AIDS	AIDS HABIT
902.3625	915.2548

13. Habit Formation across Different Commodities

COMMODITY	TAMIL NADU	PUNJAB	WEST BENGAL	GUJRAT
Cereal	Habit Forming		Habit Forming	Habit Forming
Pulse		Habit Forming		Habit Forming
Edible Oil				Habit Forming
Meat, Egg & Fish	Habit Forming		Habit Forming	Habit Forming
Other Food	Habit Forming			Habit Forming
Clothing & Footwear	Habit Forming		Habit Forming	
Fuel & Lighting	Habit Forming			Habit Forming
Non-Food	Habit Forming		Habit Forming	

REFERENCES:

- Pollak, A.Robert: “Habit Formation and Dynamic Demand Functions”, JPE Vol. .78 (1970) pp 745-763.
- Pollak, A.Robert; Howe, Howard; Wales, Trenence J : “ Theory and Time Series Estimation of the Quadratic Expenditure System”, Econometrica, Vol. 47 (Sept 1979)
- Alessi, Rob and Kapteyn, Arie: “Habit Formation, Interdependent Preferences and Demographic Effects in AIDS”, Economic Journal, May (1991).
- Blanciforte, Laura and Greene, Richard: “AIDS Incorporating Habits: An Analysis of Expenditures on Food and Aggregate Commodity Groups”, Review of Economics and Statistics.
- Heien, Dale and Durham, Cathy: “A Test of Habit Formation Hypothesis Using Household Data”, Review of Economics and Statistics, May 1991, No.2
- Pollak, A.Robert: “Interdependent Preferences” The American Economic Review, Vol. 66, and No.3 (1976).
- Kapteyn, Arie; De Geer, Sara Van; Wansbeek, Tom: “ Interdependent Preferences: An Econometric Analysis”, Journal of Applied Econometrics, Vol. 12, No.6
- Deaton, Agnus and Muellbauer, John: “ An Almost Ideal Demand System”, AER Vol. 70, No.3 1980
- Radhakrishna, R and Murthy, K.N.: “ Econometrics of Complete Demand System for India”.
- Meenakshi, J.V. and Ray, Ranjan: “ Regional Differences in India’s Food Expenditure Pattern”, Journal of International Development, 1999.