Abstract - As a result of economic planning there was a significant growth in the production in agriculture, industry and service sectors. The significant changes in all the sectors of the economy have a direct impact on the welfare of the people. The leading review of developing country surveys reveals that the consumption and saving are the best measures of the economic component of living standards.

This study examines the various forms of consumption expenditure functions under Keynes’s Psychological Law (or Absolute Income Theory) of Consumption Function. Keynes (1936) "General Theory" laid the foundations of modern macroeconomics. According to Keynes, as income increases, consumption increases, but not as much as the increase in income.

Studies about the consumption pattern of the country, its states and some specific regions have been undertaken by some organizations, institutions, field experts and researchers for different periods of time. These studies have been found to be quite useful for further work in this area, both in India and abroad. Some of which are as under:

Goyal and Singh (2002) presented a paper entitled “Demand versus Supply of Food grains in India: Implication of Food security” at 13th International Management Conference, Wageningen, Netherlands, July 7-12, 2002. In this paper they addressed the issue of shift in food consumption pattern over the years. The expenditure elasticity was used as proxy of income elasticity. The study revealed that the per capita consumption of cereals was higher in the rural areas as compared to the urban areas and the expenditure elasticity of different cereals in rural and urban areas had continuously declined over the study period of time.

Gangopadhyay and Willima (2004) studied the consumption pattern of the country, its states and some specific regions have been undertaken by some organizations, institutions, field experts and researchers for different periods of time. These studies have been found to be quite useful for further work in this area, both in India and abroad. Some of which are as under:

Gangopadhyay and Willima (2004) studied the consumption pattern of the country, its states and some specific regions have been undertaken by some organizations, institutions, field experts and researchers for different periods of time. These studies have been found to be quite useful for further work in this area, both in India and abroad. Some of which are as under:

Chatterjee, Ray et. al. (2006) examined how the pattern of India’s food consumption has been changing as a consequence of its faster economic growth. The calculations are based on the 43rd (1987-1988) and 57th (2001-2001) round of the NSSO. The main conclusion of this study is that the per capita consumption of total cereals has continued to fall in both urban and rural households, while that of edible oils, vegetables and fruits have continued to increase in urban and rural regions.

Sengupta, Raveendran et. al. (2008) examined the socio-economic profile of people of India in different
periods of time with a view to know how economic growth process has impacted their level of consumption. Authors have worked on the data sets available from NSSO. They have classified each sample household as accordingly belonging to the ‘extremely poor’, ‘poor’, ‘marginal’, ‘vulnerable’, ‘middle income’, and ‘high income’ groups.

Nathalie P. (2011) prepared a research paper on “food and prices in India: Impact of Rising food prices on welfare”. This study shows that there are differential impacts on different categories of households. Rural households are more vulnerable than urban households. In addition, the poorest households of both sectors are more penalized by rising food price than the richest households. The impact depends also on the commodity which price has increased. Indeed, an increase in cereal prices affects more the households than the same increase in fruit price.

Praduman, Anjani et.al (2011) prepared a research paper entitled “estimates of demand elasticity for food commodities in India”. In this paper, the food demand in India has been examined in the context of a structural shift in the dietary pattern of its population. The result has reinforced the hypothesis of a significant diversification in the dietary pattern of households in recent years and has found stark differences in the consumption pattern across income quartiles. The study has revealed that these estimated income elasticities vary across income classes and are lowest for cereals group and highest for horticultural and livestock.

Oligides C.(2012) presented a special article entitled “cereal consumption and per capita income in India” in EPW with volume number 6. This paper examines the relationship between per capita cereal consumption and per capita income in India. It turns out that per capita cereal consumption remains much the same at different levels of per capita income, though it does vary substantially with education levels, household size, occupation patterns and urbanization. The recent decline of cereal consumption over time may reflect changes in these non-income factors. While cereal consumption seems unrelated to per capita income, it is positively related to per capita expenditure.

Zhou Tian, et al.(2012) prepared a report on “Food Consumption Trends in China”. This report examines the recent trends in China’s food consumption, with a focus on the period of 2000-2010. Insights into such trends should be most valuable in understanding this potentially enormous food consumption market.

In this paper we have fitted the various types of models like Linear, Quadratic, and Power to the cereal consumption of rural population of India (at states and national levels) and also suggested the most appropriate one.

II. OBJECTIVES OF THE STUDY

The major objective of the study is to suggest appropriate regression model for consumption expenditure individually for each state and at national level for rural parts.

III. RESEARCH METHODOLOGY

A. Reference Period

The study covers a period of 20 years from 1993-1994 to 2011-2012. The period of twenty years is considered to be big enough to underline the trends in any activity and to infer conclusions.

B. Data Collection

The study is exclusively based on secondary source of data. Therefore, published reports of selected rounds of official surveys carried out by the Central Statistical Organization (CSO), the NSSO (National Sample Survey Office), the Ministry of Statistics and Program Implementation (MOSPI) journals and web-sites have been used.

C. Statistical Analysis

The basic methodology adopted in this study is correlation and regression analysis of Consumption Function. The Statistical Analysis has been done using MS-EXCEL and/or Statistical Package SPSS.

D. Regression Analysis

The regression analysis is useful in estimating the amount of change in the dependent variable i.e. MPCE (Monthly Per Capita Consumption Expenditure) on food items (cereals) due to change in the independent variable i.e. MPTCE (monthly per capita total consumption expenditure). It may be useful in knowing the trends in cereals consumption and formulating various macroeconomic policies relating to food issues. Here per capita total consumption expenditure is taken as a proxy variable for per capita income, because reliable data for per capita income is not available. The following regression models have been used for the analysis.

Model 1-(linear) \[ Y = a + b X + e \]

Model 2-(quadratic) \[ Y = a + b X + c X^2 + e \]

Model 3-(power) \[ Y = a \times X^b + e \]

Where, \( Y \) = Monthly Per Capita Cereal Consumption Expenditure

\( a = \text{Intercept}, \quad b, c = \text{Regression Coefficients (MPC)} \) and

\( X = \text{Monthly Per Capita Total Consumption Expenditure} \) and

\( e = \text{Error term} \)

The models specified above were estimated using regression analysis for the entire rural India and also
for the rural blocks of major states of India separately, for the reference period for which the relevant data were available from various NSSO rounds. This was done specifically to examine divergence between the estimated regression coefficients for the various models and to suggest the most appropriate model explaining the variations in Y due to X. The results (as shown in appendix) of the analysis and interpretations thereof are as under:

IV. FINDINGS

A. For Rural Parts of States

From results mentioned in appendix, the following inferences have been drawn.

Out of the 18 states all states confirm the significance of linear model and power model. One or more of the regression coefficients for 11 states out of 18 turn out to be insignificant for quadratic model under study, however almost all the states, except Chhattisgarh, confirm significance of quadratic model.

The reasonably high values of adjusted $R^2$ along with comparatively higher values of Standard Error (S.E.) of the estimate for quadratic model for the states for which the coefficients are found to be significant makes the model inappropriate for the study undertaken. Though the coefficients of the linear model are found to be significant with quite high adjusted $R^2$ across all the states under study, it gives high amount of the standard error of the estimate; suggesting that this model is inappropriate for the purpose in hand.

It can therefore be concluded that the power model is the most suitable model for the purpose in hand as it confirms not only significance of the coefficients but also the significance of model as a whole with S.E. ranging from 0.045(for Chhattisgarh) to 0.148 (for Jammu & Kashmir) and adjusted $R^2$ ranging from 0.420 (for Chhattisgarh) to 0.963 (for Gujarat and Maharashtra).

For states estimated regression coefficient $\hat{b}$ (i.e. MPC) is found to vary from 0.120 (for Chhattisgarh) to 0.689 (for Jammu & Kashmir).Here $\hat{b} =0.120$ means that 1% change in X leads to 0.120 % change in Y. Similarly $\hat{b} =0.689$ means that 1% change in X leads to 0.689 % change in Y.

Hence, the most appropriate model at state level (Rural blocks) turns out to be \[
\text{Power model } y = a \cdot x^b, e \quad \text{Where } a>0 \text{ and } 0<b<1
\]

B. For Rural India

From the appendix, the following inferences have been drawn.

Though the coefficients of the linear model and quadratic model are found to be significant with quite high adjusted $R^2$ ,both the models give high amount of the standard error of the estimate; suggesting that both the models are inappropriate for the purpose in hand.

Among all the models under study, the power model gives the lowest estimated standard error of (0.044) with highest adjusted $R^2$ (0.964); suggesting that it is the most appropriate and powerful model among all the models considered for the purpose.

Here estimated regression coefficient $\hat{b}$ (i.e. MPC) gives the value of % change in Y with respect to % change in X. In this case, for all India,$\hat{b} =0.537$ means 1% change in X (independent variable Total consumption expenditure) leads to 0.537% change in Y (dependent variable cereal consumption expenditure). This shows the importance of cereals as an item of consumption in the food basket of the rural families. Government may take some steps in the form of economic policy so that the rural consumers are able to maintain their intake of cereals. Moreover this value of the MPC is also comparable with those found in literature especially in Indian studies. The results in terms of the values of MPC which we obtained in our study are analogous to those obtained by Praduman K.,Anjani K.,et.all (2011), Nathalie P. (2011) and Oldiges C.(2012) as mentioned in the introduction.

Thus the most appropriate model at national level (Rural blocks) turns out to be Power model \[
y = a \cdot x^b, e \quad \text{Where } a>0 \text{ and } 0<b<1
\]

Thus the finalized mode for consumption function for entire rural blocks of India is:Power model \[
y = a \cdot x^b, e \quad \text{where } a>0 \text{ and } 0<b<1 \text{ with estimates: } \hat{a} =3.474 \quad \hat{b} = 0.537
\]

IV. LIMITATION OF THE STUDY

1. An Econometric study usually has limitations, even when the models are rigorously specified. The study also may suffer from limitations, which are mentioned below:

2. The study is based on the secondary data obtained from NSSO, which collects the primary data through nationwide sample survey. The accuracy of the estimates and conclusions derived of study is, therefore, affected to the extent that the samples deviate from actual representative samples.

3. Total expenditure as a proxy of income is used due to unavailability of reliable data on income.

4. There may be some important independent variables which are not included in the model, which may deprive the model of its practical significance to some extent.

5. The conclusions may not be applicable to the individual commodities within a commodity group (i.e. Cereals) as only the broad groups of commodities have been considered.
ACKNOWLEDGEMENT

We express our heart-felt sense of gratitude and indebtedness to Mr. M.B.Dave (Rtd. Associate Professor, Deptt. of Economics, VNSGU, Surat) for his valuable guidance and comments to improve this work from economics point of view.

REFERENCES

[10]. NSSO reports on “household consumption expenditure” for years 1993 to 2012.

WEB REFERENCES

[1]. http://rbidocs.rbi.org.in
[3]. http://mospi.nic.in
[4]. http://www.labourbureau.nic.in
[5]. http://planningcommission.nic.in

TABLE I - APPENDIX

THE TABLE SHOWING VALUES OF ESTIMATED COEFFICIENTS AND RELEVANT MEASURES FOR FITTING OF THE MODELS FOR CONSUMPTION