International Journal of Applied Research

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An econometric analysis of levels of food consumption expenditure in Gujarat

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Abstract
In the economic development of the any nation, the three components- income, consumption and saving are most important indicators for the development process. According to Keynes, when income increases the consumption will also increase but not in the same proportion. So, according to Keynes if the gap between income and consumption (i.e. saving) is not converted into investment, it does create the problems of unemployment. The component of consumption is, therefore, most important for the development process.

As a result of rapid urbanization, rising consumerism and changing lifestyles, the levels and patterns of the country's food consumption expenditure has also begun to change. The consumption expenditure function is a good indicator of the economic status and the standard of living and also shows the relative importance of individual items in the consumption basket.

Therefore, in this paper an attempt has been made to analyze and compare the consumption levels of some of the most important food items (cereals and milk & milk products) in the urban and rural areas of Gujarat. An attempt has been made to estimate the Marginal Propensity to Consume (MPC) of these items of consumption through regression analysis.

Key words: Consumption pattern, marginal propensity to consume, food items

1. Introduction
As a result of rapid urbanization, rising consumerism and changing lifestyles, the social fabric of the country has also begun to change. Economic development results in increased levels of income and consumption. Also, because of rise in income, economic development is likely to result in a higher demand for the existing goods and services in the short run and in the long run. It also may change the tastes of the population and may create demand for goods and services that did not exist previously. Moreover the leading review of developing country surveys reveals that consumption is one of the best measures of the economic component of living standards.

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

2. Review of literature
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 Gujarat and abroad. Some of which are as under:
- NCAER, New Delhi conducted an all Gujarat consumer expenditure survey under the title of "Pattern of Income and Expenditure, Vol:2(June, 1967)". The NCAER undertook this project to study the effect of development on household consumption. The main objective was to study and compare the pattern of consumer expenditure in those areas which were most exposed to development effort-with those areas which were the least exposed. The study was based on primary data collected in different rounds. Some of the main findings of the study were (a).

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- The per capita expenditure on cereals in the development areas is about 10% below per capita expenditure in the non-development areas. (b)The per capita expenditure on pulses is also lower in the development areas than in the non-development areas. (e) In the development areas the average per capita consumer expenditure per month per unit on cereals ranges from Rs. 7 for the lowest income class to about Rs. 12 for the higher income.
- Goyal SK and Singh JP [8], Presented a paper entitled "Demand versus Supply of Food grains in Gujarat: 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 data on consumer expenditure for both rural and urban areas were collected from various rounds of NSSO. For this study, data of five rounds viz. 27th (1972-73), 32th (1977-78), 38[Th] (1983) 43rd (1987-88) and 50 [the] (1993-94) were used. The conclusions of this study are as follows- (a) the per capita consumption of cereals was higher in the rural areas as compared to the urban areas during this period (b) There was substantial variation in percentage of total food expenditure on different food items between the rural and urban areas. The share of each food item in total food consumption over years revealed that the percentage of cereals consumption had declined by 31% and 29% in the rural and the urban areas respectively, during 1972-73. (c) The percentage consumption expenditure on milk and milk products increased by 50% in the rural areas while in urban areas, it increased by only 24% during 1972-94.
- Chatterjee S, Rae A and Ray R (2006) [7] examined how the pattern of Gujarat'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 survey 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.

3. Objectives of the study
The major objectives of the study are:
1. To obtain MPC of some of the most important major food items (cereals and milk & milk products) of Gujarat for various sub periods and for over-all period of time.
2. To examine changes in the consumption pattern of people during various sub periods and over-all period of time, with special reference to the major food items.
3. To determine and compare change in consumption pattern in rural and urban areas of Gujarat, with respect to these items.

Reference Period
The study covers a period of 20 years from 1995-1996 to 2015-2016. The period of twenty years is considered long enough to underline the trends in any activity and to infer conclusions.

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

Statistical Analysis
The basic methodology adopted in this study is regression analysis of single equation linear regression model. The Statistical Analysis has been done using MS-EXCEL and/or Statistical Package.

Regression Analysis
The MPC's for food items have been estimated using Least Square Method through 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 due to change in the independent variable i.e. MPTCE (monthly per capita total consumption expenditure). Here per capita total consumption expenditure is taken as a proxy variable for per capita income, because more reliable data are available for the former as compared to the latter. It may be useful in formulating various macroeconomic policies. The following linear regression models have been used for the analysis.

Model 1
Monthly Per capita Consumption Expenditure on food Item "cereals" (dependent variable) and Monthly Per capita Total Consumption Expenditure (independent variable).

$$MPCEC = \beta_0 + \beta_1 MPTCE$$

Model 2
Monthly Per capita Consumption Expenditure on Food Item "milk and milk products" (dependent variable) and Monthly Per capita Total Consumption Expenditure (independent variable).

$$MPCEM = \beta_0 + \beta_1 MPTCE$$

Where MPCECS = Monthly Per Capita Consumption Expenditure on Cereals

MPCEMS = Monthly per capita consumption expenditure on milk and milk products
MPTCE = Monthly per capita total consumption expenditure
β_0 = Intercept, β_1 = Regression Coefficient (MPC)

The models specified above were estimated using regression analysis for the entire Gujarat and also for the rural and urban areas separately, for each of the years - 1995, 2000, 2005 and 2010 - the years for which the relevant data were available from various NSS rounds. This was done specifically to examine divergence between the estimated regression coefficients for the rural and urban areas and also to find out how various relationships have evolved during various time periods,

Model 1: Cereals
A. Rural Area
The estimated regression equations for various years are given in the table below:

Table 1A: Estimated lines of regression of monthly per capita cereal consumption expenditure on monthly per capita total consumption expenditure

Year	Estimated Model	R	R^2
1993	MPCEC=115.82 +(-0.20**) MPTCE	-0.63	0.38
1998	MPCEC=137.91+(-0.16**) MPTCE	-0.62	0.33
2005	MPCEC=116.43 +(-0.03) MPTCE	-0.28	0.08
2010	MPCEC=149.24 +(-0.03) MPTCE	-0.34	0.11

*Significant at 10% level ** significant at 05% level, *** significant at 1% level

PCCEC = Monthly Per Capita Consumption Expenditure on Cereals

In this case, the value of β_1 is found to be negative in all the relevant years. This indicates that with increase in the monthly per capita total consumption expenditure, the monthly per capita consumption expenditure on cereals had generally decreased. This is understandable because usually with increase in per capita income (or its proxy), the families shift their expenditure from cereals to other food and non-food items. For the years 1993 and 1998, the regression coefficients are found to be significant suggesting that in those years, the relationship between the two variables was strong. Against this for the years 2005 and 2010, the corresponding regression coefficient was found to be not significant, indicating a weak relationship. In 1993 the value of β_1 is -.0.15, which shows that with one rupee increase in monthly per capita total consumption expenditure, there is a decline of 15 paisa in monthly per capita consumption expenditure on cereals. The value of β_1 in different years indicate that the monthly per capita cereals consumption expenditure had decreased with increase in monthly per capita total consumption expenditure but the impact of MPTCE on MPCE has continuously decreased, which may be due to the fact that relative importance of cereals in the consumption basket of families in the rural areas has gone down.

The value of R indicates the strength of correlation between monthly per capita total consumption expenditure and monthly per capita consumption expenditure on cereals. This value ranges between 0.28 and 0.58. In 1993 and 1998, the value of R was - o.58 and - 0.57 respectively, suggesting a strong negative correlation between the two variables.

B. Urban Area

Table 1B: Estimated lines of regression of monthly per capita cereals consumption expenditure on cereals on monthly per capita total consumption expenditure

Year	Estimated Model	R	R^2
1993	PCCEC=106.38 +(-0.09) MPTCE	-0.32	0.10
1998	PCCEC=106.94 +(-0.02) MPTCE	-0.14	0.02
2005	PCCEC=133.85 +(-0.03) MPTCE	-0.27	0.08
2010	PCCEC=156.0 +(-0.01) MPTCE	-0.11	0.01

*Significant at 10% level ** significant at 05% level, *** significant at 1% level

PCCEC = Per Capita Consumption Expenditure on Cereal

In this case, it is found that the MPC's of cereals in urban area was not significant in all years. This indicates weak relationship between monthly per capita total consumption expenditure and monthly per capita consumption expenditure on cereals. The value of β_1 was found to be -0.09 in 1993, which indicates that with increase of one rupee in monthly per capita total consumption expenditure, the per capita consumption expenditure on cereals had declined by 9 paisa. This value was -0.02 in 1998, -0.03 in 2005 and -0.01 in 2010. So, one can say that over a period of time, the impact of the monthly per capita total consumption expenditure on monthly per capita expenditure on cereals has decreased.

The value of R^2 ranged between 0.01 and 0.10 over a period of time. So it can be said that there were very small changes in the monthly per capita expenditure on cereals due to changes in the monthly per capita total consumption expenditure. This value was 0.10 in 1993, it indicates that about 10% of the variation in the monthly per capita expenditure on cereals was due to changes in the monthly per capita total consumption expenditure. It declined to 0.02 in 1998 and thereafter again increased to 0.08 in 2005 and again it declined to 0.01 in 2010.

The value of R is also found to be low during the period of 1993 to 2010. It indicates weak negative relationship between monthly per capita consumption expenditure on cereals and monthly per capita total consumption expenditure. This value is ranging between -0.11 and -0.32. Comparing the results for the rural and urban areas, it can be said that the relationship is stronger in the rural areas than in the urban areas.

Model 2: Milk and Milk Products
A. Rural Areas

Table 2A: Estimated lines of regression of monthly per capita milk consumption expenditure on monthly per capita total consumption expenditure

Year	Estimated Model	R	R^2
1993	MPCEM= -74.94 +0.36*** MPTCE	0.75	0.57
1998	MPCEM= -17.70 +0.29*** MPTCE	0.73	0.53
2005	MPCEM= -42.57 +0.16** MPTCE	0.56	0.32
2010	MPCEM= -62.14 +0.16** MPTCE	0.57	0.33

*Significant at 10% level ** significant at 05% level, *** significant at 1% level

MPCEM = Per capita consumption expenditure on milk and milk products

The results depicted in the table given above indicate that, the value of β_1 is statistically significant in all the years. As the value of β_1 is positive in all the years, there is positive impact of Monthly Per Capita Total Consumption Expenditure on Monthly Per Capita Consumption Expenditure on Milk and Milk Products in the rural areas of Gujarat. But this value has declined over a period of time, which means that importance of milk is also declining in the food basket. The value of β_1 was 0.36 in 1993, which shows that with one rupee increase in monthly per capita total consumption expenditure, there is an increase of 36 paisa in monthly per capita consumption expenditure of milk and milk products. This value has declined to 0.29 in 1998 and further declined to 0.16 in 2005, and in 2010.

The value of R^2 is found to be more than 0.50 in the years of 1993 and 1998. It was 0.57 in 1993, which indicates that about 57% of variation in the monthly per capita milk

consumption expenditure was due to change in monthly per capita total consumption expenditure. This value has also declined over a period of time and in 2010 the value of R^2 was 0.33. So we can say that over a period of time the changes in the milk consumption expenditure are not highly dependent on the total consumption expenditure. The milk consumption expenditure depends more on the other factors. The value of R is significant in all the years. It shows the strong relationship between monthly per capita total consumption expenditure and monthly per capita consumption expenditure on milk and milk products. This value ranges between 0.56 and 0.75.

B. Urban Areas

Table 2B: Estimated lines of regression of monthly per capita expenditure on milk and milk products on monthly per capita total consumption expenditure

Year	Estimated Model	R	R^2
1993	MPCEM= -25.63 +0.16 MPTCE	0.35	0.12
1998	MPCEM= -31.14 +0.5 MPTCE	0.17	0.03
2005	MPCEM= -1.06* +0.08 MPTCE	0.36	0.13
2010	MPCEM= -68.35 + 0.02 MPTCE	0.11	0.01

*Significant at 10% level, ** significant at 5% level, *** significant at 1% level
MPCEM = Per Capita Consumption Expenditure on Milk

The estimated regression lines given in the above table suggest that, the value of β_1 was not significant during the all the years. So there is weak relationship between monthly per capita total consumption expenditure and monthly per capita expenditure on milk and milk products. The value of β_1 is 0.16 in 1993, it had increased to 0.50 in 1998, and came down to 0.08 in 2005 and to 0.02 in 2010. So one can say that generally expenditure on milk and milk products has increased with increase in the total consumption expenditure, however this relationship has continuously become weaker and weaker.

The value of R^2 is found to be low. This value ranges between 0.01 and 0.13, which means that only 1 to 13 percent of variation occurring in the monthly per capita expenditure on milk and milk products was due to change in the monthly per capita total consumption expenditure.

Even, the value of correlation coefficient was also found to be low in all the relevant years, which ranges between 0.11 and 0.35.

Comparing the results for the rural and urban areas, the relationship is found to be positive in both areas, however, it is much stronger in the rural areas than in the urban areas i.e. the rural families seem to have stronger preference for Milk and Milk Products as compared to the urban families me periods. The results of the analysis and interpretations thereof are as under.

4. Findings and Conclusions
- The MPC of cereals was found to be negative, which indicate that with increase in the monthly per capita total consumption expenditure, the monthly per capita consumption expenditure on cereals had declined. But the value of MPC was found to be significant at 5% level during the initial period in the rural area and thereafter it was found to be insignificant in both the rural and urban areas of Gujarat. So we can say that the relative importance of cereals in the consumption

basket of families in the rural and urban areas has gone down.
- It was also found that the MPC's of Milk & Milk Products were significant at 1% level of significance in the years of 1993 and 1998 in the rural areas. However it was found to be significant at 5% level in the years of 2005 and 2010 in the rural areas. The value of MPCs was found to be positive in all the years which indicate that with increase in the total consumption expenditure, the expenditure on milk & milk products has also increased. The MPCs of milk & milk products found to be decreasing over a period of time in the rural areas i.e. in 1993 MPC of milk & milk product was 0.36, which declined over a period of time and came down to 0.16 in 2010. In the case of the urban areas, it was found to be insignificant in all referred periods of time. So one can say that in the rural area families the milk & milk products are important products in the food basket but in the urban families.
- The regression coefficient in the case of consumption expenditure on cereals was found to be negative in the rural as well as the urban areas, which implies that with increase in the total food consumption expenditure the share on consumption expenditure on cereals had declined over a period of time. This value was found to be significant at 10% level in some years like 1993, 1998 in the rural areas but in the urban areas it was found to be insignificant in all the years, which indicate little importance of cereal consumption expenditure in food consumption basket. This value is more moderate over a period of time in the rural and urban areas.
- We get contrasting results for the rural and urban areas in the case of estimate of the regression coefficient when consumption expenditure on milk & milk products is regressed on the total food expenditure relationship is concerned. Milk and milk products seem to be more important items in the consumption basket of the rural families as compared to the that of the urban families (i.e. in the years of 1993, 1998, 2005 and 2010, the value of β_1 was significant at 1% level in the rural areas but not significant in the urban areas, its value was found to be 0.68, 0.59, 0.44 and 0.51 in the rural areas and 0.16, 0.05, 0.12 and 0.04 in the urban areas respectively).

5. Limitations of the study
An Econometric study usually has limitations, even when the models are rigorously specified. The study also may suffer from such limitations, which are mentioned below.
1. 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.
2. The analysis done may not capture the consumption pattern of newly introduced products.
3. The conclusions may not be applicable to the individual commodities within a commodity group as only the broad groups of commodities will be considered.
4. Total expenditure as a proxy of income is used due to unavailability of reliable data on income.

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

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