CHAPTER III

METHODOLOGY

This chapter deals with a brief description of the study area selected, explains the sample design, defines the terms and concepts used in the study and finally discusses the methodology employed. For the present study, India as a whole is selected as the area of study to analyse the impact of globalisation on consumption pattern particularly the consumption expenditure and consumption function.

Consumption is the basis for all the economic activities like production, exchange, distribution etc. The aggregate level of consumption in any economy depends on the aggregate level of disposable income of the people. Consumption pattern differs across regions, calories of people, occupations, seasons, age-groups, socio-economic status etc. The present study comprises the consumption pattern of India in the pre-reform periods and the post-reform periods. This study is a macro economic study based on secondary data. It is also an analytical study using econometric models.

A. DESCRIPTION OF THE AREA OF STUDY: INDIA

Population

India, with 1,270,272,105 (1.27 billion) people is the second most populous country in the world, while China is on the top with over
1,360,044,605 (1.36 billion) people. The figures show that India represents almost 17.31 per cent of the world's population, which means one out of six people on this planet live in India. Although, the crown of the world's most populous country is on China's head for decades, India is all set to take the numero uno position by 2030. With the population growth rate at 1.58 per cent, India is predicted to have more than 1.53 billion people by the end of 2030.

More than 50 per cent of India's current population is below the age of 25 and over 65 per cent below the age of 35. About 72.2 per cent of the population lives in some 638,000 villages and the rest 27.8 per cent in about 5,480 towns and urban agglomerations. The birth rate (child births per 1,000 people per year) is 22.22 births/1,000 population (2009) while death rate (deaths per 1000 individuals per year) is 6.4 deaths/1,000 population. Fertility rate is 2.72 children born/woman (NFHS-3, 2008) and Infant mortality rate is 30.15 deaths/1,000 live births (2009 estimated). India has the largest illiterate population in the world. The literacy rate of India as per 2011 Population Census is 74.04 per cent, with male literacy rate at 82.14 per cent and female at 65.46 per cent. Kerala has the highest literacy rate at 93.9 per cent, Lakshadweep (92.3 per cent) is on the second position and Mizoram (91.6 per cent) is on third.
Sex Ratio

Sex ratio here is expressed as the number of women per thousand men in a given population at a given time. Data given per the Census of India 2001 and 2011 results. Kerala has the highest sex ratio; while Haryana has the lowest sex ratio among states and Daman & Diu has the lowest among all states and territories.

Administrative Divisions

The Administrative divisions of India are Indian sub-national administrative units; they compose a nested hierarchy of country subdivisions. Indian states and territories frequently use different local titles for the same level of subdivision. The smaller subdivisions (villages and blocks) exist only in rural areas. In urban areas Urban Local Bodies exist instead of these rural subdivisions. India is composed of 28 states and 7 union territories (including a national capital territory).

Literacy Level

Literacy in India is key for socio-economic progress, and the Indian literacy rate grew to 74.04 per cent in 2011 from 12 per cent at the end of British rule in 1947. Although this was a greater than six fold improvement, the level is well below the world average literacy rate of 84 per cent, and of all nations, India currently has the largest illiterate population. Despite government programmes, India's literacy rate increased only "sluggishly,"
and a 1990 study estimated that it would take until 2060 for India to achieve universal literacy at then-current rate of progress. The 2011 census, however, indicated a 2001–2011 decadal literacy growth of 9.2 per cent, which is the slower than the growth seen during the previous decade.

There is a wide gender disparity in the literacy rate in India: effective literacy rates (age 7 and above) in 2011 were 82.14 per cent for men and 65.46 per cent for women. The low female literacy rate has had a dramatically negative impact on family planning and population stabilisation efforts in India. Studies have indicated that female literacy is a strong predictor of the use of contraception among married Indian couples, even when women do not otherwise have economic independence. The census provided a positive indication that growth in female literacy rates (11.8 per cent) was substantially faster than in male literacy rates (6.9 per cent) in the 2001–2011 decadal period, which means the gender gap appears to be narrowing.

**Per Capita Income**

India's per capita income (nominal) is $1219, ranked 142nd in the world, while its per capita purchasing power parity (PPP) of US $3,608 is ranked 129th. It is estimated that India's Per Capita Income will register an average growth rate of 13 per cent during 2011-2012 so as to reach $4,200 by 2020. In the year 2020 India's real GDP is projected to be at $5 trillion,
and per capita Nominal GDP at $3,650. India's per capita Purchasing Power Parity (PPP) will be at $12,800 in the year 2020. States of India have large disparities. One of the critical problems facing India's economy is the sharp and growing regional variations among India's different states and territories in terms of per capita income, poverty, availability of infrastructure and socio-economic development. Although income inequality in India is relatively small (Gini coefficient: 32.5 in year 1999-2000); India's nominal Gini index rose to 36.8 in 2005, while real Gini after tax remained nearly flat at 32.6.

The estimated rate of growth in per capita income for the current fiscal, however, is lower than the previous fiscal when it grew by 13.7 per cent India's per capita income, a gauge for measuring living standard, is estimated to have gone up 11.7 per cent to Rs 5,729 per month in 2012-13 at current prices, compared with Rs 5,130 in the previous fiscal. "The per capita income at current prices during 2012-13 is estimated to be Rs 68,747 as compared to Rs 61,564 during 2011-12, showing a rise of 11.7 per cent," an official release by the Central Statistics Office (CSO) on Advance Estimate of National Income, 2012-13 showed today. The per capita income in real terms (at 2004-05 constant prices) during 2012-13 is likely to attain a level of Rs 39,143 as compared to the First Revised Estimate for the year 2011-12 of Rs 38,037, it said. The Gross Fixed Capital Formation (GFCF)
at current prices is estimated at Rs 29.94 lakh crore in 2012-13 as against Rs 27.49 lakh crore in 2011-12, the release said.

However, at 2004-05 constant prices, the GFCF is estimated at Rs 19.44 lakh crore in the current fiscal as against Rs 18.97 lakh crore in the previous fiscal, it added. The data also estimated an increase of 13.8 per cent in the Government Final Consumption Expenditure (GFCE) to Rs 11.87 lakh crore at current prices for 2012-13 against Rs 10.43 lakh crore in 2011-12. On Private Final Consumption Expenditure (PFCE) for the current fiscal, it has estimated an increase of 12.8 per cent to Rs 57.06 lakh crore at current prices as against Rs. 50.56 lakh crore in the previous fiscal.
Chart No: 3.1

MAP OF INDIA’S PER CAPITA INCOME 2010.
Composition of Consumption

As economic development gathers momentum with increase in income, the society spends a larger proportion of total income on non-food items and then on facilities of recreation and comforts. In fact, as development proceeds, the very concepts of necessaries and luxuries changes and a number of goods and services changes from luxuries to necessaries.

According to the National Sample Survey data observation, the income elasticity of demand for food shows a declining trend and the elasticity of food for non-food items shows an advancing trend as development proceeds. The hypothesis that the higher the per capita income, the lower the proportion of income spent on food has come true. From the point of view of development, this kind of structural change in consumption pattern argues well for economy. With higher income, people’s demand for education, transport, health and lowering has increased and their needs have become diversified.

Pattern of Production

In the earlier stages of economic development, agriculture was the largest economic activity in terms of the value of production. As development gathered speed, the ratio of agricultural production in total output declined and there was an increase in the shares of both industry and
services, offsetting the relative decline in agriculture. When the share of service sector remains nearly constant, the growth of industrial output acts as the only offset to agriculture’s decline. These shifts are usually complemented by changes in the structure of domestic demand. The share of agricultural income in total income declined from 40 per cent to 29 per cent, thus confirming the expectation in the development process.

Structure of Employment

Changes in consumption pattern have brought about changes in the structure of production. As logical corollary to this transformation, the composition of labour force should have changed. According to the census Reports of 1991 and 2001 occupational structure of working population had not undergone any substantial transformation in correspondence with changes in the structure of all round production and consumption pattern. Changes could be discerned by only marginally in nature. The aggregate work force had increased by 33.3 per cent during the ten (10) year period.

A study of the term trend in ‘consumption, production and employment’ as it relates to the state shows that certain changes have taken place, which is in the nature of structural transformation. It is noticed that the consumption pattern has undergone changes in the rural as well as in urban areas. The slow pace at which the commodity producing sectors have been expanding also points to certain deficiencies. This view gains evidence
when the two facts income generation and labour generation are related to each other.

**Overall Growth Performance**

The Net Domestic Product (NDP) equals the Gross Domestic Product (GDP) minus depreciation on a country's capital goods. Net domestic product accounts for capital that has been consumed over the year in the form of housing, vehicle, or machinery deterioration. The depreciation accounted for is often referred to as "capital consumption allowance" and represents the amount of capital that would be needed to replace those depreciated assets. If the country is not able to replace the capital stock lost through depreciation, then GDP will fall. In addition, a growing gap between GDP and NDP indicates increasing obsolescence of capital goods, while a narrowing gap means that the condition of capital stock in the country is improving. It reduces the value of capital that is why it is separated from GDP to get NDP.

**B. DATA BASE**

The main source of data for this analysis is the consumption data from the National Sample Survey Organisation (NSSO) Government of India. NSSO has been conducting consumer surveys on a continuing basis for every year from 1950 to 1974 except for the years 1962 - 1963 and 1971 – 1972. Thereafter the surveys have been made only over intervals of 3 to 5
NSS collects data on consumer expenditure using the interview method from sample households all over the nation. The data are available state wise for rural and urban sectors separately.

The data for this analysis concern the period from 1980 -1981 (50th round) to 2009 -2010 (68th round). For these years, the national sample survey reports provide expenditure data on 19 to 20 commodity groups and broadly uniformity is maintained. Also the concepts, definitions and procedures followed in different rounds from the year 1980 – 2010, remain more or less uniform, which makes the estimate of consumer expenditure comparable over the period of analysis.

The National Sample Survey provides the estimates on average monthly per capita expenditure of the country on food grains, meat, fish and eggs. Sugar and gur, other food, clothing, fuel and light and other non-food items. The per capita expenditure for 30 days is classified into 14 expenditure classes, all in rupees. For each of the above classes, the standard National Sample Survey table gives estimates of

i. The proportion of persons falling in each group
ii. The average per capita item expenditure
iii. The average per capita total expenditure
iv. The average size of the house hold and
v. The number of sample house holds
The information is available for the whole country and for zones, comprising various states. The standard National Sample Survey table gives estimates for two independent inter penetrating sub – samples separately, as also the combined estimates of these two sub-samples.

For the present study, time series data have been obtained from National Sample Survey Data, Economic Survey published by Government of India (2010) and Handbook of Statistics on Indian Economy (2010), Published by Reserve Bank of India. All the variables in the study are in Rupees and measures to the base year 1993. Variables used in this study like Gross Domestic Product (GDP), Net Domestic Product (NDP), Net National Product (NNP) at factor cost, Total final consumption expenditure, NDP at factor cost, Total food expenditure, Total non-food expenditure, Share of agriculture in NDP at factor cost (at market prices) are also included. The time period examined is from 1980-81 to 2009-10.

C. CONCEPTS AND DEFINITIONS USED IN THE STUDY

As it is necessary to explain and define certain important terms and concepts used by the National Sample Survey during the collection of data on personal consumption, such definitions are given below.
Gross National Product (GNP)

GNP is the total measure of the flow of goods and services at market value resulting from current production during a year in a country, including net income from abroad.

GNP includes four types of final goods, they are

1) Consumer's goods and services to satisfy the immediate want of the people,

2) Gross private domestic investment in capital goods consisting of fixed capital formation resident construction and inventories of finished goods and unfinished goods,

3) Goods and services produced by the government, and

4) Net income of goods and services, i.e., the difference between value of exports and imports of goods and services known as net income from abroad.

GNP at Factor Cost

GNP at factor cost is the sum of the money value of the income produced by and accruing to the various factors of production in one year in a country. But it is the income which the factors of production receive in return for their services alone.
Net National Product (NNP)

GNP includes the value of total output of consumption goods and investment goods. But the process of production uses up a certain amount of fixed capital. Some fixed equipment wears out, its other components are damages or destroyed, and still others are rendered obsolete through technological changes. All this process is termed depreciation or capital consumption allowance. In order to arrive at NNP, we deduct depreciation from GNP. The word 'net' refers to the exclusion of that part of total output which represents depreciation. So, NNP = GNP + Depreciation.

NNP at Factor Cost

Net National Product at factor cost is the net output evaluated at factor prices. It includes income earned by factors of production through participation in the production process such as wages and salaries, rents, profits etc. It is also called National Income. This measure differs from NNP at market prices in that indirect taxes are deducted and subsidies are added to NNP at market prices in order to arrive at NNP at factor cost. Thus NNP at factor cost = NNP at market prices – Indirect taxes + Subsidies.

Disposable Income

Disposable income or personal income means the actual income which can be spent on consumption by individuals and families. The whole of the personal income cannot be spent on consumption because it is the
income that occurs before direct taxes have actually been paid. This Disposable Income = Personal Income – Direct Taxes. But the whole of the disposable income is not spent on consumption and a part of it is saved. Thus, Disposable Income = Consumption Expenditure + Savings.

### Meaning of Consumption Function

The consumption function or propensity to consume refers to income consumption relationship. It is a "functional relationship between two aggregates, i.e., total consumption and gross national income. Symbolically, the relationship is represented as \( C = f(Y) \), where \( C \) is consumption, \( Y \) is income and \( f \) is the functional relationship.

### Meaning of shifts in Consumption Function

Whenever there are significant changes either in the intercept or in the slope or in the both we say that there is shift in the consumption function.

### Average Propensity to Consume (APC)

The average propensity to consume may be defined as the ratio of consumption expenditure to any particular level of income. It is found by dividing consumption expenditure by income, or \( APC = C/Y \).
Average Propensity to Save (APS)

The average propensity to save is the relationship between total saving and total income in a given period. It is the ratio of saving to any level of income. Symbolically, APS = S/Y. The APS is also an increasing function of income.

Marginal Propensity to Consume (MPC)

The marginal propensity to consume may be defined as the ratio of the change in consumption to the change in the average propensity to consume as income changes. It can be found by dividing change in consumption by a change in income, or MPC = ΔC/ΔY.

Marginal Propensity to Save (MPS)

The marginal propensity to save is the incremental change in saving as a result of a given increment in income. It is the ratio of change in saving to a change in disposable income. It can be obtained from MPC. MPS = 1 – MPC. This concept was introduced by Keynes.

House hold

House hold is a group of persons usually living together and sharing principal meals from a common kitchen. A boarding house, a hotel or a hostel is treated as a cluster of house holds, where each individual boarder forms a separate house hold. House holds maintained and fed directly by
government such as those in prisons, police quarters, hospitals, slums, and relief camps are however excluded from the scope of the survey.

**House hold member**

Any person, who consumes the principal meal with the house hold for atleast 16 days preceding the date of enquiry, is considered to be a member of the household. Such a person may be the head of the house hold also.

**House hold size**

The number of members in a house hold gives the house hold size.

**House hold consumer expenditure**

The expenditure incurred by a house hold on domestic consumption during the reference period is the house hold’s consumer expenditure. The house hold consumer expenditure is the total value of consumption of various groups of items namely

a. Food, pan (betel leaves), tobacco, intoxicants, fuel and light,

b. Clothing and

c. Miscellaneous good and services and durable articles.
Share of Agriculture to Non-Agriculture income

The data on the share of agricultural in Net Domestic Product is given directly, while non-agriculture share in Net Domestic Product has been computed as follows.

Share of Non-agriculture Income at factor cost = \{ \text{Total NDP at factor cost} \} - \{ \text{Share of Agricultural in NDP at factor cost} \}

The ratio of agriculture to non-agriculture in NDP at factor cost at current prices has been calculated as Ratio

\[ \text{Ratio} = \frac{\text{Share of Agriculture in NDP at factor cost at current prices}}{\text{Share of Non-agriculture in NDP at factor cost at current prices}} \times 100 \]

\[ = \frac{Y_A}{Y-Y_A} \times 100 \]

The resulting estimates of the ratio from 1980-81 to 2009-10 were used for the present study.

Variables used in the analysis

It is customary in analyzing consumer behavior from cross-section data to set out a relationship between the quantity or the amount of expenditure and disposable income. In this study, instead of using disposable income, total expenditure has been used as the independent variable. It will be useful to state the reasons for choosing total expenditure. The foremost consideration in the case is the non-availability of data on income.
D. TOOLS USED FOR ANALYSIS

The collected data were analyzed and were interpreted in the form of tables and percentage changes.

1. Percentages and averages to analyze the trends in Gross Domestic Product (GDP) and Total Final Consumption Expenditure (TFCE).

2. To calculate the percentage change of GDP and TFCE the previous year formula of the following form is employed.

\[
\frac{y_t - y_{t-1}}{y_{t-1}} \times 100
\]

Where,

\( r = \) represent percentage change over previous year

\( y_t = \) represent current year of GDP and TFCE.

\( y_{t-1} = \) represent previous year of GDP and TFCE

3. Karl Pearson’s Co-efficient of correlation is used to calculate the correlation co-efficient between Gross Domestic Product and Total Final Consumption Expenditure.

Karl Pearson’s co-efficient of correlation is computed by using the following formula.

\[
\sum \frac{xy}{\sqrt{\sum x^2 \times \sum y^2}}
\]

Where,

\( r = \) Correlation Co-efficient
\[ x = (X - \bar{X}) \]
\[ y = (Y - \bar{Y}) \]

\( \bar{X} \) and \( \bar{Y} \) are mean values of \( x \) and \( y \) series.

4. To find the compound growth rate of total final consumption expenditure and average propensity to consume, the Semi-log model was used.

\[ \ln C_t = \beta_1 + \beta_2 t + U_t \]

where, \( \beta_1 = \) intercept,

\( \beta_2 = \) slope,

\( t = \) years, \( U_t = \) random variables

The first objective of total final consumption expenditure and per capita final consumption expenditure has been analyzed by the growth model.

\[ TFCE = f(t) \]

Per Capita FCE = \( f(t) \)

\[ TFCE = a_0 + a_1 t + a_2 t^2 + U \]

Per Capita FCE = \( b_0 + b_1 t + b_2 t^2 + U \)

Regression analysis is the basic technique used in Economics for measuring or estimating the relationships among economic variables that
constitute the essence of economic theory. The main objective of estimating the economic relationships is to explain the effects of one dependent variable resulting from the changes in one or more explanatory variables. One of the methods of estimating the relationship is termed as OLS estimating method. Under the Least Square Criterion the line of best fit is said to be that which maximizes the sum of squared deviations of the points from the regression line.

The second objective of the percentage share of food and non-food expenditure in total final consumption expenditure Simple Linear Regression (SLR) model has been used.

Using the OLS method of estimation the following Simple Linear and Log Linear Consumption Functions are estimated.

\[
C_t = a + bY_t + U_t
\]
\[
F_t = a_1 + b_1C_t + U_{1t}
\]
\[
NF_t = a_2 + b_2C_t + U_{2t}
\]
\[
\text{Log } C_t = a + b \text{ Log } Y_t + U_t
\]
\[
\text{Log } F_t = a_1 + b_1 + \text{Log } C_t + U_{1t}
\]
\[
\text{Log } NF_t = a_2 + b_2 \text{ Log } C_t + U_{2t}
\]
C_t is the Per Capita Final Consumption Expenditure at 2004-05 prices in year ‘t’

Y_t is the Per Capita Net Domestic Product at 2004-05 prices in year ‘t’

NF_t is Per Capita Non-Food Expenditure at 2004-05 prices in year ‘t’

U is disturbance terms.

From the above regressions, estimates of b, b_1 and b_2 estimates of MPC for real per capita consumption, food and non-food consumption respectively were estimated. Estimates of b, b_1 and b_2 gives the estimates of elasticities of real per capita, food and non-food consumption expenditure respectively.

The third objective is to measure the influence of income distribution variable by agricultural income to non agricultural income on aggregate consumption. Here Multiple Linear Regression (MLR) model is used.

To measure the influence of income distribution variable viz, ratio of agricultural income to non-agricultural income Y_A/Y_{NA} on aggregate consumption and food and non-food consumption the following regressions are estimated by using OLS method.

\[
C_t = a + bY_t + d Y_A/Y_{NA} + U_t
\]

\[
F_t = a_1 + b_1C_t + d_1 Y_A/Y_{NA} + U_{1t}
\]
NF_t = a_2 + b_2 C_t + d_2 \frac{Y_{At}}{Y_{Nat}} + U_{2t} \\
\log C_t = a + b \log Y_t + d \log \frac{Y_{At}}{Y_{Nat}} + U_t \\
\log F_t = a_1 + b_1 \log C_t + d_1 \log \frac{Y_{At}}{Y_{Nat}} + U_{1t} \\
\log NF_t = a_2 + b_2 \log C_t + d_2 \log \frac{Y_{At}}{Y_{Nat}} + U_{2t}

For the fourth and fifth objectives to measure the shift in the consumption functions intercept and slope and the measurement of shifts in the intercepts of real per capita consumption, food and non-food expenditure functions are analyzed by using dummy variable model.

The following analysis of shifts in the aggregate consumption functions are estimated with SPSS package.

a) To measure the shift in the consumption function intercept and slope dummies are introduced into both aggregate and per capita consumption functions and functions are estimated by OLS method.

TC_t = a_1 + b_1 Y_t + b_2 \ D_1 + b_3 \ D_1 Y_t + U_t \\
TC_t = \text{Total final consumption expenditure at 2004-05 prices in year ‘}t’

Y_t = \text{Net Domestic Product at 2004-05 prices in year ‘}t’

D_1 = 0, \text{ for pre-reform periods} \\
\quad = 1, \text{ for post-reform periods}
\[ D_1 = \text{intercept Dummy} \]

\[ D_1 \ Y_t = \text{slope Dummy} \]

\( a_1 \) and \( b_1 \) refers to the intercept and slope of the function in the pre and post-reform periods.

\( b_2 \) measures the difference in the intercept in the pre and post-reform periods.

\( b_3 \) measures the difference in the slopes in the pre and post-reform periods.

There is an upward or downward shift in the function accordingly as either the differential intercepts or the differential slopes or both are positive or negative respectively.

b) Measurement of shifts in the intercepts of real per capita consumption, food and non-food expenditure functions.

Dropping the slope dummies, intercept dummies alone are retained in the following consumption functions to measure the shifts in intercepts.

\[
C_t = a_1 + b_1 Y_t + a_2 \ D_1 + U_t
\]

\[
F_t = a_1 + b_1 C_t + a_2 \ D_1 + U_{1t}
\]

\[
NF_t = a_1 + b_1 C_t + a_2 \ D_1 + U_{2t}
\]
c) Measurement of shifts in the slopes of real per capita consumption, food and non-food expenditure functions.

\[ C_t = a_1 + b_1 Y_t + b_2 D_t Y_t + U_t \]

\[ F_t = a_1 + b_1 C_t + b_2 D_t C_t + U_{1t} \]

\[ NF_t = a_1 + b_1 C_t + b_2 D_t C_t + U_{2t} \]

d) Measurement of influence of the income distribution variable \( Y_{A_t}/Y_{NA_t} \) on the shift of the function.

\[ C_t = a + b Y_t + a_2 D_t + d Y_{A_t}/Y_{NA_t} + U_t \]

\[ F_t = a_1 + b_1 C_t + a_2 D_t + d_1 Y_{A_t}/Y_{NA_t} + U_{1t} \]

\[ NF_t = a_1 + b_1 C_t + a_2 D_t + d_2 Y_{A_t}/Y_{NA_t} + U_{2t} \]

\[ F_t = a_1 + b_1 C_t + b_2 D_t C_t + d_1 Y_{A_t}/Y_{NA_t} + U_{1t} \]

\[ NF_t = a_1 + b_1 C_t + b_2 D_t C_t + d_2 Y_{A_t}/Y_{NA_t} + U_{2t} \]

\( C_t \) is the per capita consumption expenditure at 2004-05 prices in year ‘t’

\( Y_t \) is per capita NDP at 2004-05 prices in year ‘t’

\( F_t \) is per capita Food expenditure at 2004-05 prices in the year ‘t’

\( Y_{A_t}/Y_{NA_t} \) is ratio of Agricultural income to Non-agricultural income in year ‘t’

\( U_t \) is disturbance terms.
a₁ is intercept in the pre-reform period.

b₁ is slope in the pre-reform period.

a₂ is differential intercept in the pre and post reform periods, and

b₂ is differential slope in the pre and post reform periods.

**Dummy variable model alternative to the Chow test**

In order to test the change in consumption pattern or the differences in the consumption in two different periods the dummy variable alternative to the Chow test is used. The multi step Chow test procedure tells only if two regressions are different without telling what the source of the difference is. The source of difference, if any, can be pointed down by pooling all the observations and running just one multiple regression as shown below

\[ C_t = \alpha_1 + \alpha_2 D_t + \beta_1 X_t + \beta_2 (D_t X_t) + U_t \]

where, \[ C_t = \] total final consumption expenditure

\[ X = \] GDP

\[ t = \] time

\[ D = \] 1, for observations for 1991 – 2010

\[ = \] 0, otherwise (i.e., for observations in 1980 – 1990)
\[ \alpha_2 = \text{differential intercept} \]

\[ \beta_2 = \text{differential slope co-efficient} \]

In the model, \( \alpha_2 \) is the differential intercept as previously and \( \beta_2 \) is the differential slope co-efficient, indicating by how much the slope co-efficient of the second periods consumption function differs from that of the first period. Hence the introduction of the Dummy variables \( D \) in the interactive or multiplicative form enables to differentiate between slopes co-efficient of the two periods just as the introduction of dummy variables in the additive form enabled us to distinguish between the intercepts of the two periods.