ESTIMATION OF CONSUMPTION AND SAVING FUNCTION OF NEPAL

A Thesis

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LETTER OF RECOMMENDATION

This thesis entitled **Estimation of Consumption and Saving Function of Nepal**has been prepared by**Arbind Chaudhary** under my supervision. I hereby, recommend this thesis for examination to the thesis committee as a partial fulfillment of the requirements for the degree of Masters of Arts in Economics. Therefore I recommend this work for approval and acceptance.

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Tara Prasad Bhusal
Associate Professor
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Date: February 3, 2017

APPROVAL LETTER

We member of thesis committee, evaluated the thesis entitled **Estimation of Consumption and Saving Function of Nepal**prepared by **Arbind Chaudhary** to the Central Department of Economics, Faculty of Humanities and Social Sciences in partial fulfilment of the requirements of the Master Degree in Economics have found satisfactory in scope and quality. Therefore, we accept this thesis as a part of the Degree.

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Arbind Chaudhary

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ABBREVIATIONS/ACRONYMS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criteria
APC	Average Propensity to Consume
AIH	Absolute Income Hypothesis
ARDL	Auto Regressive Distributive Lag
AR	Auto Regressive
ARMA	Auto Regressive Moving Average
CBS	Central Burro of Statistics
CPI	Consumer Price Index
CUSUM	Cumulative Sum of Squares of Recursive Residuals
ECM	Error Correction Model
EG	Engle Granger
GDP	Gross Domestic Product
GDS	Gross Domestic Saving
INGO	International Non-Governmental Organization
MPC	Marginal Propensity to Consume
NRB	Nepal Rastra Bank
NGO	Non-Governmental Organization
OLS	Ordinary Least Square
PIH	Permanent Income Hypothesis
PP	Philips Parren
RIH	Relative Income Hypothesis
SBC	Schwarz Bayesian Criteria
VAR	Vector Auto Regressive
VECM	Vector Error Correction Model

CHAPTER- I

INTRODUCTION

1.1 Background of the Study

Consumption function is the relationships and representation of the consumption with its determinants. In the ground of consumption function there is many approaches and hypothesis has been developed by many renowned economists. The Absolute Income Hypothesis, which explains that the individual consumer determines the fraction of current income he will devote to consumption on the basis of the absolute level of income. The fundamental psychological law, upon which we are entitled to depend with great confidence both a priorifrom our knowledge of human nature and from the detailed facts of experience, is that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income.

Keynes (1936) gives no basis for his theory in terms of utility maximization nor indeed gives any consideration of whya consumer would behave in the way he assumes. In place of rational-choice theory, Keynes relies on his "knowledge of human nature." Nor does he give any support using numerical data, but instead claims to glean support from "detailed facts of experience." How much economics has changed in seventy years? While Keynes placed consumption theory at the centre of the macroeconomic stage, he left it for future generations of economists to work out the microeconomic basis for his theory and competing theories. At about the same time, Simon Kuznets (another Nobel laureate) refined national account measures of income and consumption and pointed out a paradox that could not be explained by the simple linear consumption function. The Kuznets Paradoxwas that the percentage of disposable income that is consumed is remarkably constant in the long run(Parker, 2010).

Keynes postulates that as a rule households increase their utility by consuming moreof the produced goods and services as their income increases. They increase their well-being by this major component of the aggregate demand. For this reason the possible determinants of the aggregate consumption function have been analyzed intensively in the economicliterature. Different consumption theories exist in

literature; nevertheless, there is no single theory of consumption that can possibly explain consumption behavior in all economies.

In the same way, The Relative Income Hypothesis, which explains that the fraction of a family's income devote to consumption depended on the level of its income relative to the income of the other families with which it identifies rather than on the absolute level of its income. If a family's income rises but its relative position on income scale remains unchanged because the income of other families with whom it identifies have seen at the same rate, its division of income between consumption and savings remain same(Duesenbery, 1949).

Parker (2010) explained in his book that the relative-income model was formulated in two variants: a cross-section version and a time-series version. These variants correspond to the cross-section and time-series aspects of the Kuznets paradox. In both variants, consumption depends on current income relativeto some income standard that the household sets based on its own past income or on the income of other households around it. In the cross-section version, Duesenberry appealed to the idea of "keeping up with the Joneses." He argued that a household's consumption would depend not just on its own current level of income, but on its income relative to those in the subgroup of the population with which it identifies itself. The household will attempt to align its consumption expenditures with those of other members of its group. Thus, households with lower income within the group will consume a larger share of their income to "keep up," while households with high incomes relative to the group will save more and consume less.

Another important consumption hypothesis is the Permanent Income Hypothesis which rejects the usual concept of current income and its replacement with permanent income. Family's permanent income in any one year is in no sense indicated by its current income for that year but it is determine by the expected or anticipated income to be received over a long period of time, stretching out a number of future years(Friedman, 1957).

In the same way another consumption hypothesis is 'The Life Cycle Hypothesis'developed by Franco Modigliani, Richard E. Blumberg and Albert Ando - like Freidman's permanent income hypothesis is that the individual's consumption in any given time period does not depend to a significant degree on his income during

that period but depends on the permanent values of his expected income or his wealth. As suggested by the name given to it, the life cycle hypothesis is based on the argument that the rate of consumption in any given period is a fact- of a plan which extends over the balance of individual's life while the income accruing within the same period is but one element which contributes to the shaping of such a plan. In the same way it is concluded that income is the determinant factor for the consumptions in the economy(Ahuja, 2011). Saving can be considered with respect to income. Saving is that part of income which is not consume or not spent. In fact, individual income is bifurcated into consumption and saving i.e. some part of income is used to consume goods and services and the test is saved. Thus, saving has a close link with income level. It will change, if income changes. Simply that part of income which is not used for consumption can be treated as a saving (Amudha&Varathan, 2015).

The classicists believe in the existence of a fully employed economy where saving and investment are always equal.According to them, saving and investment are a function of the rate of interest. Algebraically, S =f(R) and l = f(R) where R is the rate of interest (Acharya, 2014). But Keynes (1936) explained saving is the function of income.

In the context of Nepal, total consumption expenditure is calculated by summing of all private sectors' consumption and total government's consumption. Gross Domestic Product (GDP) is calculated by adding total consumption expenditure, total investment and net export. Total investment is obtained by summing of all governments' sectors investment and private sectors' investment. Net export is calculated by export minus imports from domestic line. Gross Domestic Saving (GDS) is the residual of income from the GDP after the deductionof the consumption expenditure (Nepal Rastra Bank, 2006).

1.2Statement of the Problem

Thisstudy directly concern about the major determinants of the aggregate consumption and saving of Nepal. Kanel (1991) reveled the effect of household size and composition on the consumption pattern of Nepali households over the family life-cycle, employing consumer demand theory. This studies was success to answer the microscopic composition of households and consumption. As the given determinants of life cycleconsumption, demographic structure, income, expected

income, income from bequest etc. were well studied with taking Kathmandu valley (Kathmandu, Lalitpurand Bhaktapurdistrict) as the sample. In the same way,Gaire (2010) tried to establish a relationship between real interest rate and saving of Nepal during 1975-2010And there is other unpublished master thesis determined the consumption function of Nepal in a particular VDC and municipality. So that there is still raised many curies about real aggregate consumption and saving function of Nepal. In this paper it is expected that there may be significant effect of real interest rate, foreign exchange rate, income , inflation on aggregate consumption and saving of Nepal in short run as well as in long run. Therefore bellowsquestions are to be answered in this study.

i. What are the trend and nature of the real consumption, saving, income, interest rate, exchange rate and inflation?

ii. What is the short run and long run consumption and saving function of Nepal?

iii. Does there exist long run association among the real consumption, saving, income, interest rate, exchange rate and inflation?

1.3 Objective of the Study

The general objective of the study is to estimate the aggregate consumption and saving function of Nepal. The specific objectives are given as following points:

i. to study the nature and trend of the real consumption, saving, income, interest rate, exchange rate and inflation,

ii. to estimate short run and long run consumption and saving function of Nepal

iii. toanalyze the long run association among the real consumption, saving, income, interest rate, inflation and exchange rate.

1.4 Significance of the Study

For expressing the significance of consumption function, Blake and Hammond (2004)said that there is no doubt that aggregate consumption function is a key variable for policy makers.The way of empirical study of this paper is very important at various ground. Estimation of consumption and saving of Nepal is significance for the students of the economics and commerce at the university level. This study is new millstone for macroeconomics study of Nepal. The study is more important for

researchersas well for lecturer and professors. Bankers and international traders, depositors and lenders can also achieve the ideas and knowledge in their profession through it. The study valuable for the Non - Governmental Organisations (NGOs) and International Non-Governmental Organisations (INGOs). Through the estimating of consumption and saving function of Nepal, the foreigner investors can analyse the environment of the country and help in decision for investment. So that it is important for foreign direct investment also. In this way, in one sentence, it can be said that this study is more valuable and significance for the students, professors, researchers, policy makers, diplomats, NGOs and INGOs, savers, borrowers, bankers etc.

1.5 Limitation of the Study

In spite of the several significant as it is highlighted in theabove, there are also presence some limitations in the study. It follows all systematic error which are followed by different authorities of Nepal Government during the data collection. There is no any possibility of the treatments of structural changes,for example national income, consumption and saving calculation is changed as new structure from 2000/2001. There is slightly larger volume of the variables after the 2000/2001 regarding data before 2000/2001.It must be addressed the both series data in a single series for the study. So that when its structure is changed, and the error occurs due to it, are not addressed in the study.

The study has another limitation that it cannot say anything about the separate study of Personal and Government's income, consumption and saving separately. Rate of interest over the time is mostly in the disperse patterns. In Nepal before the liberalization interest rate was determined by NRB's directives. After, liberalization it was free but not calculated weighted average of the depositing rate of the interest rate of the commercial banks.After 2012, NRB has been calculating the weighted average of interest rate if deposit of commercial bank.So its data pattern is not in a similar framework. So that in the study average value of the one year fixed saving deposit interest rate of commercial bank is chosen. Systematic error occurs due to it cannot be neglected.

The limitation of the study is that it does not cover the income from abroad and also the income and expenditure of the foreign institutions in the domestic land. The paper does not address deposit interest rate of other grade of banks rather only taking

commercial. There are so many banks and financial intermediaries like Development banks, Finical credit banks, Mutual funds. For the saving deposit Governments bond rate also effect on the national saving deposit, which rate also does not cover by the paper.

1.6 Organization of the Study

The study completes under five chapters. Chapter one is introduction. Within this heading following sub headings are included; general background of the study, research problem of the study, objective of the study, significance of the study, limitations of the study and organization of the study. This chapter also called introductory chapter.

Chapter two is review of the literatures. It is further explained by separatingtheoretical concepts and empirical concepts. Theoretical concepts are studies of the pre developedtheories with the related research topic. Empirical concept is the studies of the existence researches, articles, Reports, bulletins etc. with the related research topic. Empirical concept is further divided into two branches; one is national context and another is the international context.

Chapter three isresearch methodology. Research design, sample size, description of the variables, source of data collection, method of the data collection and data analysis tools are the basic sub topics under it. Chapter four is presentation and analysis of data. Under it, whole data processing processes are determined as the demand of research problem and nature of the data.

Last chapter or chapter five is the summary of the findings, conclusions and recommendations. After the data processing major findings are summarized first and in the second they are serially concluded under conclusion sub-topic and in the proper policy recommendation is used to given to the government and institutions also under the recommendation heading.

CHAPTER- II

REVIEW OF THE LITERATURE

2.1 Theoretical Concept

The scholarly article and developed existing theories will help in the well development of the study according to the available data from authorized sources of Nepal government. The study is indirectly motivated when all existing theories (The Absolute Income Hypothesis for Consumption, The Relative Income Hypothesis Consumption, The Permanent Income Hypothesis for Consumption, and The LifeCycle Hypothesis for Consumption) are well reviewed. Now in brief, it can be discussed about consumption and saving and its lead determinants and relations.

Keynes **(**1936) analysed the consumption function 'Absolute Income Hypothesis for Consumption' by publishing 'General theory of employment, interest and money'. It shows the several subjective and objective factors which determine consumption of a society. However according to him, the current level of income that determines the consumption of an individual and of society. Since Keynes laid stress on the absolute size of current income as a determinant of consumption. Keynes recognized that many subjective and objective factors including interest rate and wealth influenced the level of consumption expenditure, he emphasises that it is the current level of income on which the consumption spending of an individual and the society depends. Further, Keynes put forward a psychological law of consumption, according to which, as income increases consumption increases but not by as much as the increase in income. In other words, marginal propensity to consume is less than one and greater than zero. In this way Keyneshas expressed that consumption is dependent on absolute level of individual's or society's income in his body part of consumption function.

Duesenberry (1954) contributed the new refined concept about consumption function named 'The relative income hypothesis of the consumption'. In which basically put forwarded the theory of consumer behavior which lays stress on relative income of an individual rather than his absolute income as a determinant of his consumption. Another important departure made by him from Keynes's consumption theory is that, according tohim, the consumption of a person does not depend on his current income

but on certain previously reached income level. According to him, consumption of an individual is not the function of his absolute income but of his relative position in the income distribution in a society, that is, his consumption depends on his income relative to the incomes of other individuals in the society. For example, if the incomes of all individuals in a society increase by the same percentage, then his relative income would remain the same, though his absolute income would have increased. According to him, because his relative income has remained the same the individual will spend the same proportion of his income on consumption as he was doing before the absolute increase in his income. That is, his APC will remain the same despite the increase in his absolute income.

As mentioned above, empirical studies based on time-series data made by Kuznets During 1869-1938 revealed that over a long period the average propensity to consume remains almost constant(Ahuja, 2011). Duesenberry (1954) relative income hypothesis suggests that in the long run the community would continue to consume the same proportion of income as its income increases and saving as a proportion of income of the individuals with relatively low incomes would not rise much with the increase in their incomes. That is, their savings would not rise to the same proportion of income as was being done by the individuals who had the same higher income prior to the present increase in income.

This is because with the increase in incomes of all individuals by the same proportion, the relative incomes of the individuals would not change and therefore they would consume the same proportion of their income. This applies to all individuals and households. It therefore follows that assuming that relative distribution of income remains the same with the growth of income of a society, its average propensity to consume would remain constant.Thus, this conclusion of the relative income hypothesis differs from the Keynesian theory of consumption according to which, as seen above, as absolute income of a community increases, it will devote a smaller proportion of its income to consumption expenditure, and that is, its APC will decline. It is important to note that relative income theory implies that with the increase in income of a community, the relative distribution of income remaining the same, does not move along the same aggregate consumption function, but its consumption function shifts upward. Since as income increases, movement along the same consumption function curve implies a fall in average propensity to

consume, Duesenberry's relative income hypothesis suggests that as income increases consumption function curve shifts above so that average propensity to consume remains constant(Ali & Rahman, 2015).

Further, according to Keynes (1936) this is also partly due to the fact that they become accustomed to their previous higher level of consumption and it is quite hard and difficult to reduce their consumption expenditure when their income has fallen. They maintain their earlier consumption level by reducing their savings. Therefore, the fall in their income, as during the period of recession or depression, does not result in decrease in consumption expenditure very much as one would conclude from family budget studies.

Friedman (1957) developed the consumption function named 'Permanent income theory of consumption'. It was differed from life cycle consumption theory, like the life cycle approach, according to Friedman, consumption is determined by long-term expected income rather than current level of income. It is this long-term expected income which is called by Friedman as permanent income on the basis of which people make their consumption plans. To make his point clear, Friedman gives an example which is worth quoting. According to him, an individual who is paid or receives income only once a week, say on Friday, he would not concentrate his consumption on one day with zero consumption on all other days of the week. He argues that an individual would prefer a smooth consumption flow per day rather than plenty of consumption today and little consumption tomorrow. Thus consumption in one day is not determined by income received on that particular day. Instead, it is determined by average daily income received for a period. This is on the line of life cycle hypothesis. Thus, according to him, people plan their consumption on the basis of expected average income over a long period which Friedman calls permanent income.

It may be noted that permanent income or expected long-term average income is earned from both 'human and non-human wealth.' The income earned from human wealth which is also called human capital refers to the return on income derived from selling household's labor services, that is, efforts and abilities of its labor. This is generally referred to as labor income. Non-human wealth consists of tangible assets such as saved money, debentures, equity shares, and real estate and consumer

durables. It is worth noting that Friedman regards consumer durables such as cars, refrigerators, air conditioners, television sets as part of households' non-human wealth. The imputed value of the flow of services from these consumer durables is considered as consumption by Friedman (Shapiro, 2013).

Now, what is the precise relationship between consumption and permanent income (that is, the expected long period average income). According to permanent income hypothesis, Friedman (1957) thinks that consumption is proportional to permanent income. Permanent income, as is generally defined is the steady rate of consumption a person could maintain for the rest of his or her life, given the present level of wealth and income now and in the future. However, it is very difficult for a person to know what part of any change in income is likely to persist and is therefore permanent and what part would not persist and is therefore transitory.

Friedman has suggested a simple way of measuring permanent income by relating it to the current and past incomes. According to him, permanent income is equal to the last year's income plus a proportion of change in income occurred between the last year and the current year. In accordance with permanent income hypothesis, short-run consumption function curves are flatter as compared to the long-run consumption function curve indicating that the short-run marginal propensity to consume is lower than long-run marginal propensity to consume. The reason for this is that the individual is not sure whether the increase in income will persist over the longer period which determines the consumption plans of individuals. Therefore, the individuals do not fully adjust their consumption expenditure according to their higher current income than would be the case if the current increase in income is expected to be permanent.

If the rise in income happens to be permanent, that is, if the next year's income is equal to the higher income of the current year, the individual will fully adjust his consumption expenditure to the higher income level. However, if the individual is sure that the increase in income is permanent he will adjust his consumption quickly to higher current income. It, therefore, follows that whereas in the short run average propensity to consume falls as income increases because people are not sure whether the increase in income will persist or not. But when they actually find that the increase in income is permanent, they fully adjust their consumption to their higher permanent income as reflected in the long-run consumption function(Ahuja, 2011).

Permanent income hypothesis is similar to life cycle hypothesis and differs only in details. Like the life cycle hypothesis, permanent income hypothesis can explain the puzzle about the relationship between consumption and income, namely, whereas in the long-run time series data, consumption- income ratio (i.e., APC) is constant, in the short run it declines with the increase in income as we have seen above. The permanent income hypothesis is quite consistent with the constancy of APC in the long run and its variation in the short run (Shapiro, 2013)

Ando and Modigliani (1963) had later developed 'The life cycle theory of consumption'. According to the theory, the consumption in any period is not the function of current income of that period but of the whole lifetime expected income. Thus, the individual is assumed to plan a pattern of consumption expenditure based on the expected income in their entire lifetime. It is further assumed that individual maintains a more or less constant or slightly increasing level of consumption. However, this level of consumption is limited by his expectations of lifetime income. A typical individual in this theory in his early years of life spends on consumption either by borrowing from others or spending the assets bequeathed from his parents. It is in his main working years of his lifetime that he consumes less than the income he earns and therefore makes net positive savings. He invests these savings in assets, that is, accumulates wealth which he consumes in the future years. In his lifetime after retirement he again dis-saves, that is, consumes more than his income in these later years of his life but is able to maintain or even slightly increase his consumption in the lifetime after retirement. Some important conclusions follow from the life cycle theory of consumption.

The fundamental idea of the life-cycle hypothesis is that people make their consumption plans for their entire lifetime and further that they make their lifetime consumption plans on the basis of their expectations of lifetime income. Thus in the life cycle model consumption is not a mere function of current income but on the expected lifetime income. Besides, in life cycle theory the wealth presently held by individuals also affects their consumption.

After reviewing of all the above theory, it is concluded that the relationship of consumption and saving with different determinants (e.g. Current income, Relative income, Permanent and Expected income, Whole lifetime expected income and so on) are the effect of consumption and saving. In one sentence that it can be said that

there are all the nominal term of nominal or disposable income influenced the consumption as well as saving level of the economy in different time dimension (short run /long run and current/expected future) is described in the above theories.

2.2 Empirical Studies

Empirical context of the literature review shows the pre-developed study of the related research papers, books, reports, bulletins etc. which are related to the own research topic. It may be from domestic land and or from overseas. So that for the more precision empirical study is divided under two sub- heading, one is international context and another is national or Nepalesecontext.

2.2.1 International Context

Yang (1964) compaired the keynsian consumption function as an international comparision among eighteen countries arround the world by testingweather the level of current income is the main determinant of the level of current consumption in the short run, and the marginal propensity to consume is less than unity.Simple Regression and Correlation methods were applied in the research. Researcher fouded that that for most of the eighteen countries included in this study, the level of consumption is highly correlated with the level of current income. When the preceding year's income was introduced as another variable, an improvement in the goodness of fit in the income-consumption relation was achieved for eight countries, of which only four cases were significant. Investigation also revealed that the degree of instability in rates of growth in income significantly determines the degree of correlation between income and consumption. Thus, the more stable the rate of growth the higher the degree of correlation between income and consumption, and vice versa. With regard to the Keynesian assumption of less-than-unity marginal propensity to consume, it was found that there are three countries for which the value exceeds unity.

Tsao (1975) stimulated the linear property of consumption function. Methodology of the research was Maximum Likelihood Method. He found that consumer’s spending decision depends on the relative magnitudes of his real income and real wealth.

Schmalense (1980) determined the causal relationship between aggregate consumption and advertisement expenditure. The econometrical tool of the study was

Granger Causality Test. The finding of the study was expressed that the fluctuation in aggregate consumption is not statically significant cause by aggregate advertisement.

Gylfason (1979) represented an empirical estimation of the effect of interest rate and inflation on aggregate consumption in the United State. Ordinary Least Square was the main econometrics tool applied for the empirical calculation on it. Conclusion of the research paper was that the aggregate consumption is the inversely related to interest rate and directly related to the inflation rate. This was the unique finding of the United State during the decades of 1970.

Macklem (1994) examined an aggregate consumption in Canada that includes financial, physical and human wealth. The main tools used in the paper were ADF test and Cointegration. Conclusion and finding of the study was that wealth has significant over and above the information already contained in current disposable income remains an important determinant of consumption in both short run and long run.

Adebiyi (2005) observed the causal link between savings & growth. VAR model, Unit Root Test and Granger Causality test were the main tools of the study. Conclusion of the study was obtained that Saving-GDP ratio granger cause per capita income. It means as well as current saving increases future consumption falls.

Forgha (2008) determined the consumption and saving function in Cameroon and also searched the long run relationship between the variables. Error Correction Model, ADF test and Co-integration were the main econometrical tools of the study. The major findings of the Forgha's were: greater percentage of Cameroonians is low income earners as such greater percentage of their incomes are directed towards consumption than savings and investment; the demand for money to hold by Cameroonians favours transactional and precaution motives and indifference in the case of speculative move. This was justified by consumption's responsiveness to the general price level, expected inflation and the rate of interest; the sizes of the Cameroonians households induce consumption to a greater extent than any of the explanatory variable specified in the consumption function; Savings in Cameroon depend on income but most savings are target savings and are indifference to interest rate.Long-term savings in Cameroon is a poor since the rate of inflation is higher.

Devereux et al (2009) estimated consumption and real exchange rates in professional forecasts using the 28 countries from 1990 to 2008. Throw the analysis of the covariance between the variables it was predicted that there is positive relationship between expectations of relative consumption growth and real depreciation across countries.

Dreger (2011) investigated the impact of wealth on private consumption. Through the panel cointegration test it was founded that consumption; income and wealth are co-integrated in their components.

Amin (2011) revealed the long run relationship between final consumption expenditure and economic growth in Bangladesh. The tools of the study were Augmented Dickey Fuller Test, Philips-Perron and EG Test. The conclusion of the study was, there exist long run co-integration between final consumption and economic growth.

Mical and Palumbo (2012) determined the relationship between income, wealth and consumption. Methodologies were ADF Test, VECM and Granger Causality Test. The major findings were, there exist at least one co-integration between the variables and bi-directional causal relationship presence.

Olurekinse and Alimi (2012) analyzed the causal relationship between government spending and national income in Nigeria, Ghana and South Africa between 1970 to 2012. Econometric tools were OLS, Granger Causality Test and Co-integration Test. Finding of the research was that there is a long run relationship between two variable. The causality test proved that there is bi-directional causality that runs from National Income to Government expenditure and vice versa for Nigeria, Ghana and South Africa.

Christensen (2012) explored the affecting of interest rate on household consumption and saving in United State by using the Federal Reserve economic data from 1962 to 2012. There were applied the linear regression model as the tool of the econometrics. Finally researcher found that lower the rates of interest rate lead to higher the consumption level.

Alimi (2013) determined the way of consumption expenditure by AIH for the case of Nigeria and present a consumption function for Nigeria. Engle Granger Test and Granger Casualty were the main tools for the study. After testing the data it was

found fist, APC is constant and as well as increase the income it declines as unsystematically. It mean there was income elasticity of the consumption does not follow Keynesian prediction in Nigeria. It was also found that in the long run the elasticity of the consumption of about 1 percent and above 1percent evidently there were other determinates of the consumption rather than the income.

Nayak (2013) analyzed the determinants and patterns of saving behavior in rural household of western Odisha with taking primary survey of 300 households drawing a sample from rural villages of Sundergarh district of Odisha. The determinants of saving are analyzed empirically by a linear regression method. The present study reveals that the APC and MPC of the rural households varies in terms of the distribution of income and occupation i.e. in other words, the lowest income groups (the agricultural labors and the non- agricultural labors) have the highest marginal propensity to consume which leads to lowest marginal propensity to save as compared to the other occupational groups. The study finds that most of the rural households have low educational status which is resulting in less awareness of the people towards the benefits of saving. They are even careless towards their health standard as the consumption of local liquor is very prominent in these households which in a way or the other detoriating the health as well as the financial condition of these households.

Kawakwa (2013) determined the short run and long run determinants of national saving in Ghana. The aim of this paper was to examine the short run and long run of saving function with taking expected variables; growth rate of GDP per capita, terms of trade, dependency ratio, financial development, dummy variable for political instability and interest rate. Through ADF, Johansen cointegration method and error correction model technique it was founded that the coefficient of terms of trade is positive and highly significant. A one percent change in the terms of trade will lead to about 0.93 percentage change in savings, real interest rate points to the fact that changes in the interest rate have a negative and significant effect on savings, The effect of financial deepening on savings though negative is not significant, dependency ratio (DR) has the expected sign of negatively affecting savings significantly. A 1 percent increase in the number of dependents to the working, population is expected to reduce savings by 3.517 percent at a significant level of one percent in Ghana and Political stability is also found to be a significant determinant

for savings in Ghana. This is seen from the negative and significant coefficient of the dummy which took a value of 1 for periods of Coup'd' estate in Ghana and 0 for civilian rule.

Epsag and Tapsin (2014) analysed the household consumption expenditure in EA-18 by using panel data between 2000 to 2012. OLS was the methodology of the paper and finally concluded that Euro Zone 1 dollar increase in GDP will the households' consumption by 0.566 dollar.

Kirill, Breido and Treugub (n.d) determined theoretical and practical aspects of Keynesian consumption function in the finance university under the government of Russian federation international finance faculty Moscow Russia during 1980 to 1996. Method of the study was Simple Linear Regression. In the study it was found that MPC (marginal propensity to consume) of the households which is equal to 18% only of their disposable income.

Apere (2014) revealed an issue of private consumption expenditure in Nigeria. The tools applied in the research were ADF, EG test, Co-integration, ECM. Finally it was found that there is long run association between private consumption and income.

Finlay and Price (2014) investigated household saving behavior in Australia, as well as thedrivers behind the recent rise in the aggregate household saving ratio. The main method applied in the paper was simple linear regression. After the investigation it was concluded thatexplaining differences in saving behavior across households are consistent withtheory and previous findings.

Khan (2014) investigated the relationship between income and consumption of farm household in district Peshawar, Khyber, Pakhtunkhwaprovince of Pakistan.OLS was the methodology of this study. The results of the study confirms that farm households follow Dusenberry's relative income hypothesis and that household consumption is not only affected by household current level of income but by the highest level of income previously attained as well as the consumption patterns of other households.

Loumrhari (2014) investigated the empirically relationship between population ageing and private saving in Morocco using an overlapping generation model (OLG) using annual data from 1880 to 2010. Econometric estimates show that if the increase in the

dependency ratio negatively affects the growth rate of savings, as predicted by the lifecycle theory, longevity to the contrary tends to stimulate the same savings.

Samantarayan and Patra (2014) determined the households saving function in India from 1973 to 2012. To find the major determinates of households saving of India , following the variables were taken ; real GDP, dependency ratio, real interest rate, inflation, gross fiscal deficit, as percentage of GDP, share of agriculture as percentage of and net barter term of trade. ARDL model was the research methodology for the study. Finally it is concluded that variables namely, income, age dependency, interest rate and inflation which were found to be statistically significant as determinants of household savings in India. In the long run there were also found statistically significant in the short run. However, the magnitudes of short run coefficients were smaller as compared to their long run counter parts.

Alimi (2015) estimated a consumption function under permanent income hypothesis in Nigeria and South Africa from 1980 to 2013. The major tools were ADF, PP, Johansson Co-integration and ECM. After the estimating consumption function with taking households consumption expenditure, real GDP and real interest rate, it was found that there exist a long run relationship between the consumption and income for the two countries. Data for the Nigeria suggested that the behavior is based on expected future income. In case of South Africa, the study show that past consumption has effect on current consumption as expressed by Dusenbery (1954) in the relative income hypothesis.

Ali and Rahman (2015) endeavored to study the Keynes's short-run consumption function (SCFk) with some special assumptions that SCFk is misleading to formulate the macroeconomic policiesin Bangladesh withdeveloped a modified short-run consumption function (SCFm). There was some assumptions that the SCFm shows that total consumption is lower than the total consumption by SCFk. So, the saving derived from SCFm is higher than the saving derived from SCFk. OLS was the methodology of the research paper. Researchers concluded thatSCFm helps to calculate the exact amount of consumption, saving, investment to formulate macroeconomic policy (policies) properly which has great impact in macroeconomics.

Ajudu (2015) determined determinants of aggregate consumption expenditure in Nigeria. ADF andCointegration Test were the main methods of the study.

Researcherfound that the Nigerian consumption function confirm to Keynesian consumption function. Also found that there is positive relationship between income and expenditure in the long run. Similarly interest rate, price level and Exchange rate were significant variable explained consumption behavior in Nigeria.

2.2.2 Nepalese Context

Kanel (1991) examined the effect of household size and composition on the consumption pattern of Nepali households over the family life-cycle, employing consumer demand theory. The research method used in the paper was non liner regression method with maximum likelihood method. After testing the models, it was found that changing household composition does significantly affect household's consumption patterns. A restricted model, where demographic variables do not have any effect on consumption pattern was also estimated. The log-likelihood ratio test regarding the comparison of the restricted model and the unrestricted model indicates that the restricted model should be rejected because demographic variables do have a significant effect on household consumption.

Gaire (2010) analyzed the relationship between real interest rate and saving behavior in Nepal during 1975 - 2010. Simple Correlation Analysis was the research methodology applied. In the paper it was found that there is very low average real interest rate and there is long run relationship between the real interest rate saving behavior of Nepal.

Basnet (2011) examined the effects of the total foreign aid on gross domestic saving of Nepal by using time series data of 32 years from 1975 to 2006. ADF Test, Granger Causality andEG Cointegration Test were the main methods of the study. After the empirically analysis researcher found that there is more than proportional effect of foreign aid to gross domestic savings; in other words, one unit change in foreign aid will increase approximately more than one unit change in gross domestic savings of Nepal. It means that there is no sign of dependency of foreign aid from this cointegrated analysis

Shrestha (n.d) explained the long-run and cyclical behaviour of private savings in Nepal during the period 1974-2005. Through the ADF and ECM it was founded that 0.309 as marginal propensity to save with the corresponding value of 0.365 in the long-run. The estimation results revealed that real income, real government savings,

real foreign savings, real interest rates, and labour market constraints play important roles in determining private savings in the short and long-run.

Khan et all (2015) invested the PIH in five south Asian countries; Bangladesh, Nepal, India, Pakistan and Srilanka through ARDL model. It was the justification of that there is the very difficult to predict their permanent income in developing countries. But Nepal is unique among all, there is high MPC in the short run and long run.

Bhandari (2016) analysed trend and linear relationship of income and consumption in Nepal by applying time series data between 2000 to 2015. Through the OLS method, researcher applied the gross national disposable as the proxy for income and gross national consumption as the proxy for the consumption of Nepal. After the empirical analysis it was found that there is increasing trend of gross national disposable income and consumption of Nepal and there was positive and significant relationship established between incomeand consumption. MPC was found 0.65 for Nepal.

2.3Research Gap

In the related studies, Yang (1964), Tsao (1975), Gylfason (1979), Kanel (1991),Macklem (1994), Adebiyi (2005), Forgha (2008), Dreger (2011), Amin (2011),Basnet (2011)Olurekinse and Alimi (2012)Alimi (2015), Khan et all (2015) and all are reviewed for development of this paper. Among all,Tsao (1975), Gulfason (1979), Macklem (1994) and Kanel (1991)were found that the real income and wealth are the main determinants of the consumption function.Yang (1964) invested that in the research paper that there were founded the greater htan unity of mpc, which is the remarkable point against the Keynesianabsolute income hypothesis for the consumption. Kawakwa (2013) established the significant saving function in Ghana and found that terms of trade, dependency ratio,financial development, political instability as dummy variable as the determinants. Kawakwaexplained the monetary, demographic and political factors as the determinant for the saving function in Ghana. This is the very unique study for this paper.

When it is talked about national reviews,Kanel (1991),Gaire (2010) Basnet (2011), Bhandari (2016)and Shrestha (n.d) discussed about the related with this paper. Gaire (2010) only observed the saving and real interest raterelationship whereasBasnet (2011) revealed that national income is the positive and significant determinant of the

consumption function of Nepal. Shrestha (n.d) explained the long run cyclical behaviour of saving, which was just a far from this study.

Before the two decades professorKanel (1991) examined the household size and composition on the consumption pattern of Nepali households over the family life-cycle, employing the consumer demand theory. This is very important but it was not the study of aggregate level but it is the new millstone of the Nepalese consumption study. One of the remarkable finding was founded by Khan et all (2015) during the determination of the Keynesian consumption function about five south Asian countries and there is founded highest MPC of Nepal among all. It does not relate with the all objectives of this paper although it is very closely related with the paper.

For the estimation ofthe study, is unable to find as before in Nepal. International reviews expressed the determination of this kind of study, very well.So that for Nepal it is necessary to study more. In the last, it can be said thatthere is the gap of related this kind of study at present time. And, also can be said that this study is original and first.

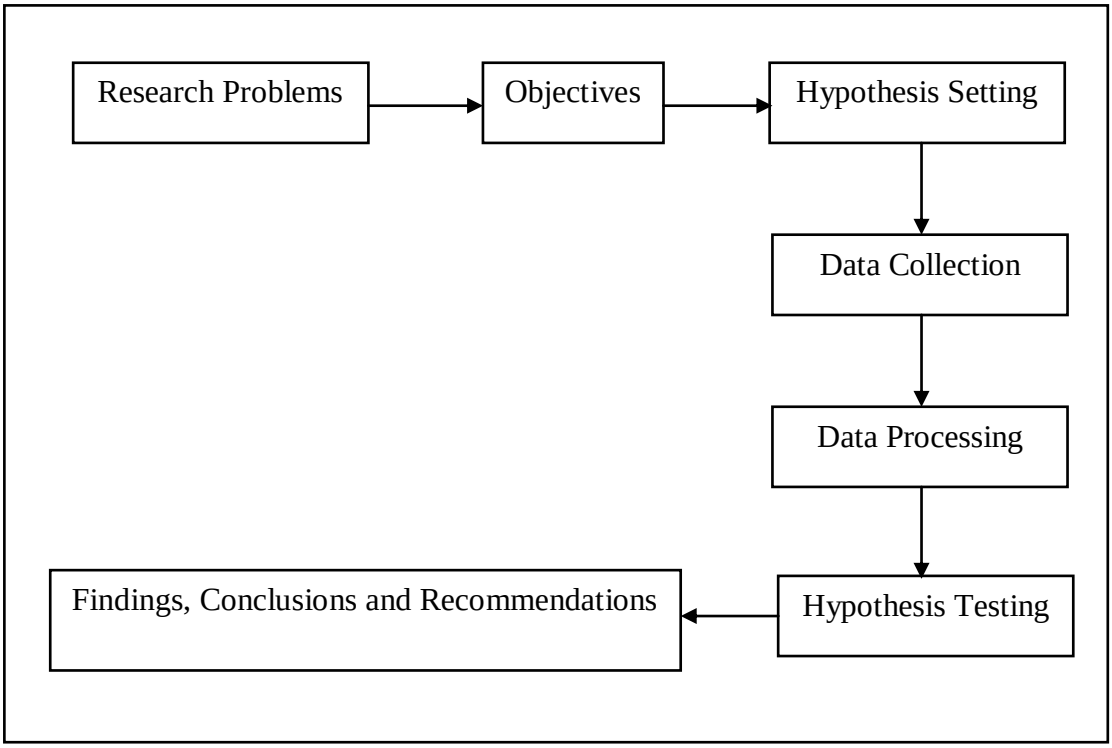
CHAPTER - III

RESEARCH METHODOLOGY

3.1 Research Design

The conceptual framework of this study starts from the data collection to empirical analysis. The variables used in this study will be collected through different government buddies. It is the based on chronological order. After the arrangement of the all data, further processing process can be performed through the best tools. The entire designing will be summarized here by following charts.

Table 3.1: Conceptual Framework of Research Design



From the above table, it is clearly said that the entire research is started from the research problem raised. Setting objectives and hypothesis setting are the second process. In the third, data collection processing steps are adapted. After testing the hypothesisproper findings, conclusion and recommendations are given to the related institutions. In the data collection process there is applied secondary data. Econometric tools are used to identify the better results. Hypothesis testing is testing by separating null and alternative hypothesis in this paper.

3.2 Sample Size

The sample size determination is the act of choosing the number of observations or replicates to include in a statistical sample. The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample. In practice, the sample size used in a study is determined based on the expense of data collection, and the need to have sufficient statistical power. In complicated studies there may be several different sample sizes involved in the study: for example, in a stratified survey there would be different sample sizes for each stratum. In a census, data are collected on the entire population, hence the sample size is equal to thepopulation size. In experimental design, where a study may be divided into different treatment groups, there may be different sample sizes for each group(Bhatarai, 2010).

This paper caries the sample size from 1975 to 2015total observation is 41. It means the sample of this study is larger. The data are collected from the different government bodies for example CBS, NRB etc. In Nepal there was statically office established from the 1959called CBS.

3.3 Nature and Source of the Data

All the data are used in this study is quantitative in nature. Data of the interest rate is taken from the various sources of quarterly economic bulletins published by the research department of the Nepal Rastra Bank (NRB).In the same way, gross domestic product, gross domestic saving, gross domestic consumption are taken from'A Handbook of Financial Statistics 2014' from 1974/75 to 2012/13. Remaining observations and the variable 'exchange rate'are taken are taken from the 'Quarterly Economic Bulletin 2016'.

3.4Description of the Variables

In the Study, Gross Domestic Product (GDP), Gross Domestic Saving (GDS), Exchange rate of US dollar ($), Inflation rate (Π), Average One YearFixed Deposit Interest Rate of the Commercial Bank (R). All the variable are used in the real form. GDP is the proxy for the National Income, GDS is the taken as proxy for the Aggregate Saving, Dollar is taken as proxy for the Foreign Exchange rate and R is the

proxy for the saving deposit interest rate. All thedetail about the description of the Variables which are used in the study are represented as bellows table:

Table 3.2: Description of the Variables

Variables	Explanation
C	'C' is introduced as real consumption. After the inflation adjustment in the GDC, C is obtained. It is calculatedby following formula: C= (GDC/Deflator)*100.
S	'S'stands for real saving. Saving is that part of income which is not consume or not spent. It is obtained by bellows formula. S= (GDS/ Deflator)*100
Y	'Y' is introduced as real income. Real income iscalculated by using bellows formula. Y= (GDP/ Deflator)*100
R	'R' is the average real average fixed saving deposit interest rate of commercial bank. It is calculated as following formula: R= Nominal Interest Rate – Inflation Rate
$	'$' stands for real exchange rate. It is the calculated as following way: $ = [Nominal exchange value of domestic currency* (CPI_USA/CPI_Nepal)]
Π	'Π' stands fordomestic inflation rate. It is the calculated as following way $\Pi=[(CPI_t- CPI_{t-1})/CPI_{t-1}]*100$
CPI	CPI stands for consumer price index. Among the 41 observation, 2015 is selected as the base year (2015=100).

3.5Method of the Data Collection

In economics, there is both (primary and secondary) methods are more popular for collection of the data. In the primary method sampling and non-sampling or total enumeration methods are used for the data collection and sampling methods are further takes two branches; one is the systematic sampling and another is the random -sampling. There are so many further divisions in the data collection process in the

sampling method.In the same way another method of the data collection is secondary method. In this method researcher takes the data from any authorized sources. It may be published or unpublished. The study is going to be analysed a time series analysis of the different variables from 1975 to 2015. So that in the last, it can be said that the research paper based upon the secondary data published by Nepal Rastra Bank (NRB), Economic survey of ministry of the finance, CBS etc.

3.6 Model Specification

This study is based on the time series data and for the determination of the consumption function and saving function of Nepal, it is carried out by linear empirical modeling. It may be simple linear regression better known as ordinary least square or it may be standard linear methods, for example Johansson or EG test or ARDL. After the test of the basic asymptotic property of the time series data, further econometric model selection is applied but in that process one thing is clear that dependent variables are real consumption and real saving with the series of the independent variables are real income, real exchange rate, real interest rate and inflation. This kind of relation can be expressed by following economical modeling: C = c (Y, Π, $, R) and S = s (Y,Π, $, R). These relations can be expressed as the econometrical expression also known as the liner modeling form.

$\ln C = \propto + \beta_1 \ln Y + \beta_2 \ln\$ + \beta_3 \Pi + \beta_4 R + \varepsilon$……………………………………..….(1)

$\ln S = \theta + \gamma_1 \ln Y + \gamma_2 \ln\$ + \gamma_3 \Pi + \gamma_4 R + \varepsilon_2$ ………………………………........(2)

Where,

C = Real Consumption

S = Real Saving

Y =Real Income

Π = Inflation rate

$ = Real Exchange Rate

R = Real Interest Rate

$\propto$ and θ =Drift components

$\beta_i$and γ_i = Regression coefficients and ε_i = White nose residuals and i =1, 2, 3,…..

3.7 Tools of Data Analysis

For the estimating of this paper, first it requires to check whether the data are stationary or not! The processofchecking stationary is called unit root testing. This is the one of the most important asymptotic property of the time series data. After testing it, proper econometric models are selected for the data processing. In the study, ADF and ARDL model are used as tools of data analysis.The details of these tools are as follows:

3.7.1 Unit Root Test

As a prelude to working with time series variables one must investigate whether underlying time series data is stationary or not. Failure to assess the stationary (or non-stationary) nature of the time series data may lead to spurious regression. Further, when forecasting or conducting tests for causality one can obtain results that may be miss –specified. A series Y_t is called stationary if its mean and variance over the time are constant and the covariance between two time periods is time invariant. Using mathematical notation it is expressed as following way:

$E(Y_t) = E(Y_{t-1}) = \ldots\ldots\ldots\ldots = E(Y_{t-s}) = \mu$,

$V(Y_t) = V(Y_{t-1}) = \ldots\ldots\ldots\ldots = V(Y_{t-s}) = \sigma^2$and

$Cov(Y_t, Y_{t-s}) = Cov(Y_{t-j}, Y_{t-j-s}) = \gamma_s$ [if it is set s = o, it is obtained that γ_o which is simply the variance of Y_t]

Unit Root Test can be tested by different methods like Dickey-Fuller Test, PP, ADF Test(Bhusal, 2013).

3.7.1.1 ADF Test

If a simple AR(1) model is imposed when the underlying the econometric methodology, first examines the stationary properties of each time series of consideration. The present study uses Augmented Dickey-Fuller (ADF) unit root test to examine the stationary of the data series. It consists of running a regression of the first difference of the series against the series lagged once, lagged difference terms and optionally, a constant and a time trend. This can be expressed as following expression where lnC is taking as a variable for examine the unit root test through Augmented Dickey Fuller Method.

$\Delta \ln C_t = \propto_0 + \propto_1 .t + \propto_2 . \Delta \ln C_{t-1} + \sum_{j=1}^{p} \propto_j \Delta \ln C_{t-j} + \varepsilon_t$

The additional lagged terms are included to ensure that the errors are uncorrelated. In this ADF procedure, the test for a unit root is conducted on the coefficient of $\ln C_{t-1}$in the regression. If the coefficient is significantly different from zero, then the hypothesis that $\ln C_t$contains a unit root is rejected. Rejection of the null hypothesis implies stationary. Precisely, the null hypothesis is that the variable $\ln C_t$is a non-stationary series (H0: $\propto_2 = 0$) and is rejected when $\propto_2$ is significantly negative (Ha: $\propto_2 < 0$). If the calculated value of ADF statistic is higher than McKinnon's critical values, then the null hypothesis (H0) is not rejected and the series is non-stationary or not integrated of order zero, I(0). Alternatively, rejection of the null hypothesis implies stationary. Failure to reject the null hypothesis leads to conducting the test on the difference of the series, so further differencing is conducted until stationary is reached and the null hypothesis is rejected. If the time series (variables) are non-stationary in their levels, they can be integrated with I (1), when their first differences are stationary(Mishra, 2011).

3.7.2ARDL Model

When the variables of the time series data are stationary at both integrated at level I(O) and integrated at first difference I(1) simultaneously Pesaran et all(2001) suggest that use the Autoregressive Distributive Lag Model (ARDL). The autoregressive distributed lag cointegration procedure introduced by Pesaran and Shin (1999) and Pesaran, Shin, and Smith (1997, 2001) has been used to examine the long-run relationship between the money demand and its determinants. This test has several advantages over the well-known residual-based approach proposed by Engle and Granger (1987) and the maximum likelihood-based approach proposed by Johansen and Julius (1990) and Johansen (1992). One of the important features of this test is that it is free from unit-root pre-testing and can be applied regardless of whether variables are I(0) or I(1). In addition, it does not matter whether the explanatory variables are exogenous (Pesaran& Shin, 1997). An ARDL regression model looks like this:

$\ln C_t = \propto + \ln C_{t-1} + \ldots . + C_{t-i} + \beta_{1i} \ln Y_{t-i} + \beta_{2i} \ln \$_{t-i} + \beta_{3i} \Pi_{t-i} + \beta_{4i} R_{t-i} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots (i)$

Where ε_t is a random disturbance term, autoregressive means independent variables

are explained (in part) by lagged values of itself, and distributed lag component in the form of successive lagsexplanatory variable (Budha, 2012).

3.7.2.1 Diagnostic Test

Diagnostic test of the residuals are very importanttest for the study of ordinary least square (OLS) method. The properties or the assumptions should be fulfilling for the fulfilled for the accurate results. Unless it provides us the spurious result(Wooldridge, 2012). When there are the largenumber of observations normality test should not be necessary(Gujarati, Porter, & Gunasekar, 2009). The major Diagnostic tests are as follows:

(i)Serial Correlation LM Test

This test is an alternative to the *Q*-statistics for testing serial correlation. The test belongs to the class of asymptotic (large sample) tests known as Lagrange multiplier (LM) tests.Unlike the Durbin-Watson statistic for AR(1) errors, the LM test may be used to test forhigher order ARMA errors and is applicable whether there are lagged dependent variables or not. Therefore, we recommend its use (in preference to the DW statistic) whenever you are concerned with the possibility that your errors exhibit autocorrelation. The null hypothesis of the LM test is that there is no serial correlation up to lag order, where is a pre-specified integer. The local alternative is ARMA(r,q) errors, where the number of lag termsρ=max(r,q). Note that this alternative includes both AR(ρ) and MA(ρ) error processes, so that the test may have power against a variety of alternative autocorrelation structures.The test statistic is computed by an auxiliary regression as follows:

$Y_t = X_t\beta + \in_t$

where,β are the estimated coefficients and $\in$ are the error. The test statistic for lag order ρ .is based on the auxiliary regression for the result of $\in = y - X_t\beta$:

$e_t = X_t\gamma + \sum_{\theta=1}^{p} \propto_0 e_{t-}\theta + v_t$

This is a regression of the residuals on the original regressors X and lagged residuals up toorder ρ.It is reported that that there are two test statistics from this test regression. The *F*-statistic is anomitted variable test for the joint significance of all lagged residuals. Because the omittedvariables are residuals and not independent variables, the exact finite sample distribution ofthe *F*-statistic under H_0 is still not

known, but we present the *F*-statistic for comparisonpurposes.The observed R-squared statistic is the Breusch-Godfrey LM test statistic.

This LM statistic iscomputed as the number of observations, times the (uncentered) R from the test regression.Under quite general conditions, the LM test statistic is asymptotically distributed as a$\chi^2(\rho)$.The serial correlation LM test is available for residuals from either least squares or two-stageleast squares estimation. The originaregression may include AR and MA terms, in which case the test regression will be modified to take account of the ARMA terms (Eviews9).

ii) Hetereoscedasticty

When the variance of the unobserved error, *u*, conditional on the explanatory variables, is constant in the OLS is called Homoscedasticity. Homoscedasticity fails whenever the variance of the unobserved factors changes across different segments of the population is called heteroscedaticity.it is ariseswhen there is the segments are determined by the different values of the explanatory variables. For example, in a savings equation, heteroscedasticity is present if the variance of the unobserved factors affecting savings increases with income.

Homoscedasticity is needed to justify the usual *t* tests, *F* tests, and confidence intervals for OLS estimation of the linear regression model, even with large sample sizes.Heteroscedasticity does not cause bias or inconsistency in the OLS estimators of the beta coefficients. Whereas something like omitting an important variable would have this effect.Heteroscedasticity does not affect the goodness of fit – R^2 and adjusted R^2(Wooldridge, 2012). But in case of presence of the heteroscedasticty there is the problem of incorrect OLS coefficients, estimates will be inefficient etc.The test of the presence of the heteroscedasticty can be deducted by defferent method but here it is tested by various methods e.g. Park Test,Glejser Test, Breuch-Pagan Godfrey Test etc. Let see Breuch- Pagan Godfery Test in detail:In statistics, the Breusch–Pagan test, developed in 1979 by Trevor Breusch and Adrian Pagan, is used to test for heteroskedasticity in a linear regression model. It was independently suggested with some extension by R. Dennis Cook and Sanford Weisberg in 1983. It tests whether the variance of the errors from a regression is dependent on the values of the independent variables. In that case, heteroskedasticity is present. Suppose that following regression model is estimated:$y = \beta_0 + \beta_1 x + u$ and obtain from this fitted

model a set of values for $\tilde{u}$, the residuals. Ordinary least squares constrains these so that their mean is 0 and so, given the assumption that their variance does not depend on the independent variables, an estimate of this variance can be obtained from the average of the squared values of the residuals. If the assumption is not held to be true, a simple model might be that the variance is linearly related to independent variable.

$\tilde{u}^2 = \gamma_0 + \gamma_1 x + v$

This is the basis of the Breusch–Pagan test. It is a chi-squared test: the test statistic is distributed $n\chi^2$ with *k* degrees of freedom. If the test statistic has a p-value below an appropriate threshold (e.g. $p<0.05$) then the null hypothesis of homoscedasticity is rejected and heteroskedasticity assumed(WikiVisually).

(iii) Normality Test

The normality is the one of the classical linear regression for residual diagnostic test. Which means the residual term (u) is normally distributed. It means mean $E(u_i)$, Variance $E\ [u_i - E(u_i)^2]$ and $Cov.(u_i, u_j)$ equals zero. This statement mathematically can be illustrated as:$u_i \sim N(0,\sigma^2)$(Gujarati, Porter, & Gunasekar, 2009). Normality test can tested by Jarque- Bera test.In statistics, the Jarque–Bera test is a goodness of fit test of whether sample data have the skewness and kurtosis matching a normal distribution. The test is named after Carlos Jarque and Anil K. Bera.Jarque-Berais a test statistic for testing whether the series is normally distributed. The test statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution.

The statistics JB has asymptotic chi-square distribution with two degree of freedom and can be used to test the null hypothesis that the data are from a normal distribution. The null hypothesis is a joint hypothesis of skewness being zero (which is the same as kurtosis of 3). As the definition of JB shows, any deviation from this increase the JB statistics(Bhusal, 2013).

The JB statistic is computed as:

$$Jarque-Bera\ = \frac{N}{6}[\,S2\ +\ (K-3)2/4]$$

Where, N is the sample size, S is the sample skewness, and K is the sample kurtosis.
For large sample sizes, the test statistic has a chi-square distribution with two degrees of freedom (Eviwes9).

(iv)Ramsey RESET Test

RESET stands for Regression Specification Error Test and was proposed by Ramsey (1969). The classical normal linear regression model is specified as:

$Y = X\beta + \in$

Where, the disturbance vector $\in$is presumed to follow the multivariate normal distribution N (o, σ^2I). Specification error is an omnibus term which covers any departure from theassumptions of the maintained model. Serial correlation, heteroskedasticity, or non-normalityof all violate the assumption that the disturbances are distributed N (o, σ^2I). Tests forthese specification errors have been described above. In contrast, RESET is a general test for the following of specification.

- Omitted variables; X does not include all relevant variables.
- Incorrect functional form; some or all of the variables in Y and X should be transformed to logs, powers, reciprocals, or in some other way.
- Correlation between X and $\in$, which may be caused, among other things, by measurement error in X , simultaneity, or the presence of lagged Y values and serially correlated disturbances.

Under such specification errors, LS estimators will be biased and inconsistent, and conventional inference procedures will be invalidated. Ramsey (1969) showed that any or all of these specification errors produce a non-zero mean vector for$\in$. Therefore, the null and alternative hypotheses of the RESET test are:

$$H_0: \in \sim N(o, \sigma^2 I)$$
$$H_1: \in \sim N(\mu, \sigma^2 I) \qquad \mu \neq 0$$

(3.7.2.2 Bound Test/ Co-integration

Traditional methods of estimating cointegrating relationships, such as Engle-Granger (1987) or Johansen's (1991, 1995) method, or single equation methods such as Fully Modified OLS, or Dynamic OLS either require all variables to be I(1), or require prior knowledge and specification of which variables are I(0) and which are I(1). To alleviate this problem, Pesaran and Shin (1999) showed that cointegrating systems

can be estimated as ARDL models, with the advantage that the variables in the cointegrating relationship can be either I(0) or I(1), without needing to pre-specify which are I(0) or I(1). Pesaran and Shin also note that unlike other methods of estimating cointegrating relationships, the ARDL representation does not require symmetry of lag lengths; each variable can have a different number of lag terms(Eviews9).

For the bound test of the above equation can be converting into following way:

$$\Delta \ln C_t = \propto + \Sigma \beta_{0i} \Delta \ln C_{t-i} + \Sigma \beta_{1i} \Delta \ln Y_{t-i} + \Sigma \beta_{2i} \Delta \ln \$_{t-i} + \Sigma \beta_{3i} \Delta \Pi_{t-i} + \Sigma \beta_{4i} \Delta R_{t-i} + \theta_0 C_{t-1} + \theta_1 \ln Y_{t-1} + \theta_2 \ln \$_{t-1} + \theta_3 \Pi_{t-1} + \theta_4 R_{t-1} + \varepsilon_t \quad \text{(ii)}$$

In this equation (ii) Δ is the first difference, $\propto$is the drift component and $\varepsilon_t$is the white noise residuals. The coefficients $(\theta_4 - \theta_0)$ represent the long run relationship, whereas the remaining expression with summation sign $(\beta_4 - \beta_0)$represents the short run dynamics of the model(Budha, 2012). It is important to test 'F-test'. The null hypothesis of this bound testing is as follows:

H_0: $\theta_0 = \theta_1 = \theta_2 = \theta_3 = \theta_4 = 0$

A rejection of H_0 implies that we have a long-run relationship(Giles, 2016). A key assumption in the ARDL / Bounds Testing methodology of Pesaran *et al*. (2001) is that if the F statistic is the greater than the significance levels:10, 5 ,2.5 and 1 percent then null hypothesis is rejected or it can be called that there is the long run relationship among the variables. F statistics can be calculated by the following ways:

$$F = [(RSS_R - RSS_{UR})/m] / [RSS_R/(n-k)]$$

Where,

RSS_R =Residuals Sum of Square of Restricted Regression

RSS_{UR} = Residuals Sum of Square of Unrestricted Regression

m= Number of Restrictions

n= Number of Observations

k = Number of Parameters in unrestricted regression.

3.7.2.3 ECM/Short Run Dynamics

An error correction model belongs to a category of multiple time series models most commonly used for data where the underlying variables have a long-run stochastic trend, also known as counteraction. ECMs are a theoretically-driven approach useful for estimating both short-term and long-term effects of one time series on another. Theterm error-correction relates to the fact that last-periods deviation from a long-run equilibrium, the error, influences its short-run dynamics. Thus ECMs directly estimate the speed at which a dependent variable returns to equilibrium after a change in other variables. The unrestricted error correction model based on the assumption made by Pesaran*et al.* (2001) was also employed for the short-run dynamics of the equation (ii) can be expressed as:

$$\Delta lnC_t = \beta_0 + \Sigma\ \beta_i \Delta lnC_{t-i} + \Sigma\rho_j \Delta lnY_{1t-j} + \Sigma\delta_k \Delta\Pi_{2t-k} + \Sigma\ \vartheta_x ln\$_{3t-x} + \Sigma\ \mu_y R_{4t-y} + \gamma EC_{t-1} + e_t \quad \text{……………………………………..(iii)}$$

Where, γ is the speed of adjustment parameter and EC is the residuals that are obtained from the estimated cointegration model of equation (ii). The error correction term (EC) is, thus, defined as: $EC_t = lnC_t - \rho_1 lnY_1 - \delta_1\Pi_1 - \vartheta_1 ln\$_1 - \mu_1 R_1$where, $\gamma_1 = -(\theta_2/\theta_0)$, $\gamma_2 = -(\theta_3/\theta_0)$, $\gamma_3 = -(\theta_4/\theta_0)$ are the OLS estimators obtained from equation (ii). Equation (iii) represents error correction model and term 'γ'is the error correction coefficient or speed of adjustment parameter. It should be always less than zero.

3.7.2.4 Stability Test: CUSUM and CUSUMQ

The CUSUM test was introduced by Brown et al. (1975) for the study of structural change and the original test statistic was constructed based on cumulated sums of recursive residuals. Ploberger and Kramer (1992) extended the CUSUM test to OLS residuals.Nowadays, these tests are widely used in econometrics and statistics, andhave become especially popular because they draw attention to structural change and breakpoints in the data(Xiao & Phllips, 2002).The CUSUM test (Brown, Durbin, &Evans, 1975) is based on the cumulative sum of the recursive residuals. This option plots the cumulative sum together with the 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between the two critical lines. The CUSUM test is based on the statistic:

$W_t=\sum_{r=k+1}^{t} w_r/S_t$ $\quad$ $t = k+1,\ldots\ldots,T$

Where*w* is the recursive residual defined above, and Sis the standard error of the regression fitted to all *T* sample points. If the b vector remains constant from period to period, $E[W_t] = 0$, but if β changes, W_t will tend to diverge from the zero mean value line. The significance of any departure from the zero line is assessed by reference to a pair of 5% significance lines, the distance between which increases with *t*. The 5% significance lines are found by connecting the points:

$[k, \pm 0.948(T-k)^{1/2}]$ and $[T, \pm 3*0.948(T-k)^{1/2}]$

Movement of W_t outside the critical lines is suggestive of coefficient instabilityThe CUSUM of squares test (Brown, Durbin, and Evans, 1975) is based on the test statistic.

$S_t=\sum_{r=k+1}^{t} w_r^2/\sum_{r=k+1}^{t} w_r^2$

The expected value of *S* under the hypothesis of parameter constancy is $E[S_t]= (t-k)/(T-k)$ which goes from zero at $t=k$ to unity at $t=T$. The significance of the departure of *S* from its expected value is assessed by reference to a pair of parallel straight lines around the expected value. The CUSUM of squares test provides a plot of against *t* and the pair of 5 percent critical lines. As with the CUSUM test, movement outside the critical lines is suggestive of parameter or variance instability

CHAPTER- IV

PRESENTATION AND ANALYSIS OF DATA

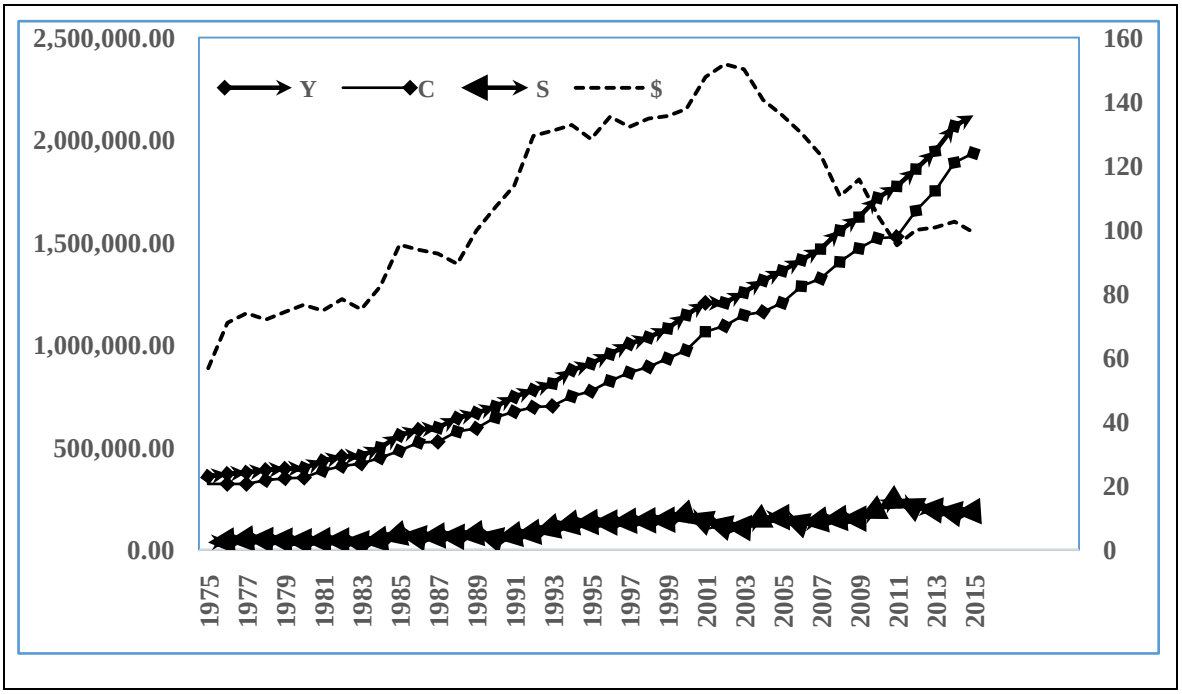
4.1. Trend and Nature Analysis of the Real Consumption, Saving, Income, Exchange Rate, Interest Rate and Inflation

The study of nature and trend of the variables over the time period is very important for this paper. The study about trend and nature of the variables can be explained by following two points separately:

4.1.1 Trend and Nature Analysis of the Real Income, Consumption, Saving and Exchange rate

The figure 4.1 shows that Real Consumption (C), Real Income (Y) and Real Saving (S) are in the increasing order during the time of 1975 to 2015. It is also show that the real saving is slowly moving upward where, real income and consumption are increasing rate. In 2011 it is obtained from the figure that the real saving is highest among the all sample size. After the 2011, real saving slowly goes downward whenever the realincome and consumption still moving upward.

Figure 4.1.: Trendof Real Income, Consumption, Saving and Exchange rate



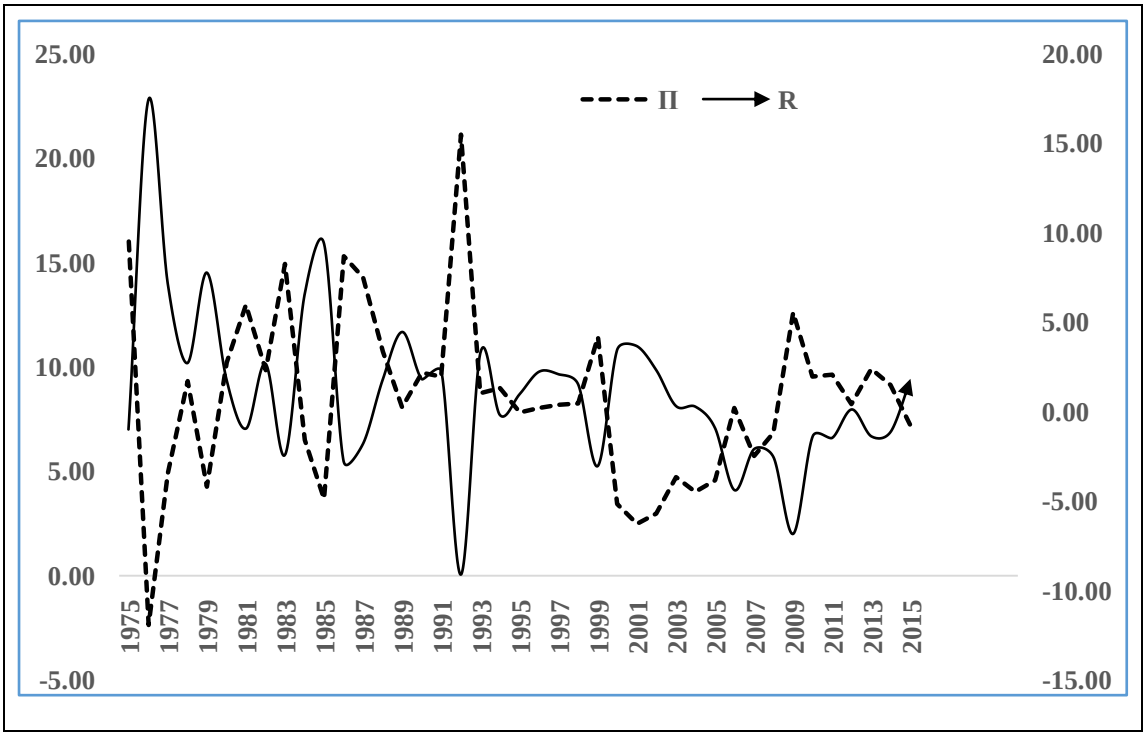
Source: Author's calculation The real exchange rate ($) is placed in the secondary axis/ right side of the figure. It shows that the real exchange rate is least in 1975 is

one dollar equals Rs 56.77, after it progressively moving upward with smaller fluctuations and makes history of highest in 2002. After that it seems moving downward persistently. According to the appendix C, it is found that the average value of the Real Income is the Rs.1002433 million per year. In the same way,the average values of Real Consumption and saving are Rs 890892.2 and 111684.6 million per year. Real exchange rate is recorded one dollar equals to Rs.108.02 on an average per year. The variable real income, consumption and saving are positively skewedbut real exchange rate is negative skewed. All the variables are platykurtic in nature. It means they are not exactly bell shaped distribution.

4.1.2 Trend and Nature Analysis of the Real Interest and Inflation Rate

In Figure 4.2, Real Interest Rate (R) is placed in the secondary axis towards right side. Among all observations, in 1976 there is recorded highest real interest rate (17.38 percent) and lowest in 1992 is -9.12 percent. The CPI inflation(Π) is noticed in negative during 1976 and highest in 1921. The real interest rate is highly effected by inflation and maximum observations is recorded negative due to inflationary pressure.

Figure 4.2: Trendof Real Interest and Inflation Rate



Source: Author's calculation

According to the appendix c, among the total observation, it is found that the real interest rate is 1.068 percent and Inflation is 8.512 percent on an average per year. The variables real interest rate and inflation are positively skewed. In the same way, the distribution ofreal interest rate and inflation are leptokurtic in nature. This means the variables,real interest rate and inflation rate are also not bell shaped distributed.

4.2 Short Run and Long Run Consumption and Saving Function

4.2.1 Augmented Dickey Fuller Test/ Unit Root Test

As it is described in chapter third, sub point 3.7.1.1 it is tested one by one in level from and first difference. Each categories further tested as intercept and another form is intercept and trend. The study introducesthe variables lnY. lnC, lnS, ln$, R and Π are checked one by one with the null and alternative hypothesis as follows example:

H_0 = the variable lnY has unit root/ the variable lnY is not stationary.

H_1 = the variable lnY has not unit root/ the variable lnY is stationary and so on.

4.1 Augmented Dickey Fuller Test

Variable	Level		First Difference		Remark
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	
lnC	0.29 (0.97)	3.06 (0.106)	7.62*** (0.0000)	7.53*** (0.0000)	I(1)
lnS	1.44 (0.55)	2.83 (0.193)	6.58*** (0.0000)	6.51*** (0.000)	I(1)
lnY	0.43 (0.89)	1.27 (0.88)	6.06*** (0.0000)	5.84*** (0.0000)	I(1)
ln$	2.79** (0.069)	6.59*** (0.0000)	-	-	I(0)
R	5.07*** (0.0002)	6.59*** (0.0000)	-	-	I(0)
Π	5.53*** (0.0000)	5.45*** (0.0003)	-	-	I(0)

Source: Author's Calculation

Note : ** and *** shows , 5% and 1% level of significance respectively; and numeric value between (…) express corresponding p- values and non-parenthesis are absolute t- statistics.

From the table 4.1, it is clearly expressed that the Null hypothesis of the variables lnY. lnC, lnS, ln$, R and Π are rejecting at the significance levels. The variables lnC, lnY and lnS are rejecting the null hypothesis at first difference I(1) at the significance level of one percent, whereas ln$, R and Π are rejecting the null hypothesis at level form I(0) at the significance level of one percent.Pesarenet all(2001) suggest selecting econometric model for the study, is ARDL model on the basis of the obtained ADF test results. For the ARDL model, at least one variable should be stationary at the level form and other at first difference but there is no any matter when it becoming stationary at second deference.

4.2.2 ARDL Model

On the basis of the mathematical specification of the ARDL model in given point number 3.7.2,it can be specified the ARDL model for the analysis of the consumption and savingfunction. For the deriving model AIC suggests the selecting proper lag structure in the model. The specification of the ARDL model for consumption and saving function model are specified here on the basis of maximum dependent lag are 4 and 3, maximum fixed regressors are also 4 and 3.Lag structure of the each models are 4, 0, 2, 0, 0 for the series of lnC, lnY, ln$, Π, R for consumption and 3, 3, 2, 0, 0 for series of lnS, lnY, ln$, Π, R for saving model automatically with the help of eviews9. So the specification of the models are as follows:

LNC = C(1)*LNC(-1) + C(2)*LNC(-2) + C(3)*LNC(-3) + C(4)*LNC(-4) + C(5)*LNY + C(6)*LN$ + C(7)*LN$(-1) + C(8)*LN$(-2) + C(9)*R + C(10)*Π + C(11)……..(I) and

LNS = C(1)*LNS(-1) + C(2)*LNS(-2) + C(3)*LNS(-3) + C(4)*LNY + C(5)*LNY(-1) + C(6)*LNY(-2) + C(7)*LNY(-3) + C(8)*LN$ + C(9)*LN$(-1) + C(10)*LN$(-2) + C(11)*R + C(12)*Π + C(13)……..(II)

The equation (I) shows the ARDL model specification of the consumption function and equation (II) is the saving function. The ARDL model of consumption function is suggested by Akaike Information Criteria (AIC) having least value is -5.41 among the 20 samples model. In the same way, ARDL model for the saving with least value of AIC -1.19. Both models demanded fixed regressors is Restrictive Constant. After the running the models with help of eviews9, following coefficients are founded, which are substituted in the above equations (I) ad (II) simultaneously.

LNC = 0.27*LNC(-1) + 0.30*LNC(-2) - 0.205*LNC(-3) - 0.165*LNC(-4) + 0.793*LNY + 0.099*LN$ - 0.069*LN$(-1) - 0.*LN$(-2) - 0.009*R - 0.0084*Π + 0.4977……../……..(III) and

LNS = 0.504*LNS(-1) + 0.036*LNS(-2) - 0.263*LNS(-3) + 1.57*LNY - 1.276*LNY(-1) - 2.916*LNY(-2) + 3.3325*LNY(-3) - 0.7409*LN$ + 0.518*LN$(-1) + 0.91*LN$(-2) + 0.0619*R + 0.054*Π - 5.076…..…….(IV)

4.2.2.1 Diagnostic Test

The ARDL model for the consumption and saving is shown in equation (III) and (IV) respectively. The diagnostic tests of the both models are as follows:

Table 4.2: Diagnostic Test

Diagnostic Tests	Consumption Model	Saving Model
R- squared	0.999	0.967
Adjusted R-squared	0.999	0.952
F- statistics	4510.49(p value=0.000)	62.39(p value =0.0000)
AIC(least among 20 model)	-5.74	-1.98
D-W test	1.88	2.13
$\varkappa^2_{(\text{Autocorrelation})}$	0.59(p-value=0.743; lag=2)	01.37(p-value=0.50;lag=2)
$\varkappa^2_{(\text{Normality})}$ /JB test	0.494(p value =0.781)	0.815(p value 0.664)
$\varkappa^2_{(\text{Heteroscedasticity})}$ /BP test	4.55(p value = 0.9188)	4.35(p value = 0.976)
$\varkappa^2_{(\text{Functional Form/RESET Test})}$	4.55(p-value=0.47;lag=1)	2.46(p-value=0.11;lag=2)

Source: AppendicesE and G

The above both model's diagnostic result shows that overall both models are good. In the given both ARDL model are overall good because the F statistics is staticallysignificant at the less than 1 percent of significance level. R squared is 99 and 96 percent simultaneously for the model and adjusted R Square are 99 and 95 percent respectively for the consumption model and saving model. According to the Pesarenet al (2001)ARDL model should be free from the serial correlation for the further analysis of the model. According to the diagnostic test from the above table, it

can be said that the models are overall good for the further processes. Basically serial correlation LM test shows that the condition of the rejection of the null hypothesis, means this models are free from serial correlation. Ramsey test also shows the specification are best of the both model.

4.2.2.2 Error Correction Model /(Short Run Dynamics)of the Models

The short run effect or the short run dynamics of the ARDL model of consumption and saving models are significantly expressed bellows summary table on the basis of the calculated results in the appendix J and L. These are also called short run consumption and saving function

Table 4.3:ECM/(Short run dynamics) of the Models

`	**Dependent Variables**	
Independents Variables	**ΔLnC**	**ΔLnS**
ΔlnY	0.812*** (0.0000)	1.53** (0.045)
Δln$	0.102** (0.021)	-0.746** (0.032)
ΔΠ	-0.0058** (0.0416)	0.049** (0.036)
ΔR	-0.0068 ** (0.016)	0.056** (0.015)
ECM_{-1}	-0.8095 *** (0.0000)	-0.7237*** (0.0000)

Source: Appendices J and L

In the given above table, numeric value without parenthesis is the short run coefficients and within the parentheses is the corresponding p values. The variables real income, exchange rate, inflation and real interest rate are the significant determinants of the consumption and saving function of Nepal in short run. This relations can be also expressed by following linear form:

ΔLnC =0.81***ΔlnY +0.102**ln$ -0.0058**ΔΠ - 0.0068**ΔR

- $0.8095^{***}ECM_{-1}$ …… (V)

$\Delta LnS = 1.53^{**}\Delta lnY - 0.746^{**}\Delta ln\$ + 0.049^{**}\Delta\Pi + 0.056^{**}\Delta lnR$

$-0.7237^{***}ECM_{-1}$ ……(VI)

Equation (V) and (VI) are the short run consumption and saving function for the Nepal during the observations between 1975 -2015. The speed of adjustment parameter or the error correction coefficients of the short run consumption and saving model are -0.8095 and -0.723respectively, are statistically significant. This shows 80.95 percent of speed of convergence of the model in each year for the consumption and 72.37 percent for the saving model when it disperse from the equilibrium. In the short run consumption function, if the ΔlnY increase by one percent in short run, real consumption expenditure increase by 0.81 percent on an average. The coefficient of real exchange rate is positive, it shows that domestic currency depreciate will increase the level of real consumption. It established inverse relation between the real consumption and depreciation of the domestic currency in the short run. In the same way, coefficient of the inflation and real interest rate are very lowand significantly negative (-0.0058 and -0.0068).

In the short-run saving function, real income, exchange rate, inflation and real interest rate are statistically significant determinants of the saving function. Marginal propensity to Save (MPS) is obtained higher than unity (1.53) in the short run analysis, is statistically significant. The coefficient of the real exchange rate is also higher(-0.746) and significantly negative, it shows that there is positive relationship exist between real saving and the domestic currency depreciation. The variables real interest rate and inflation have very low coefficient and significantly negative also, expressed that they are negatively effect on real saving of Nepal in the short- run.

4.2.2.3 Long Run Equilibrium of the Models

The long run effect or equilibrium of the consumption model and saving model show the dependent variable's mobility due to independent variables' movement in the long run. According to the analysis of the appendix Mand K, following long run function can be summarized by tabulated form:

Table 4.4: Long Run Equilibrium of the Models

	Dependent Variables	
Independents Variables	**LnC**	**LnS**
LnY	0.99*** (0.0000)	0.99*** (0.0000)
Ln$	-0.138*** (0.0000)	0.951*** (0.0008)
Π	-0.0105*** (0.0001)	0.075*** (0.00052)
R	-0.0117*** (0.0001)	0.085*** (0.0025)
C	-0.626*** (0.002)	-7.022*** (0.0005)

Source: Appendices M and K

In the above table, numeric values within the parentheses is the corresponding p values and without parentheses are the long run coefficients. The estimated long run consumption and saving function can be written as the following equations:

lnC = 0.626***+0.998***lnY -0.138***ln$ - 0.0105*** Π- 0.0117***lnR…..(VII)

lnS =-7.022*** +0.989***lnY+ 0.951***ln$ +0.075***Π+0.085***lnR…..(VIII)

The major findings in the equation (VII) that if real income increased by one percent, real consumption increased by 0.998 percent which is the significant at level of 1 percent significant level. Real interest rate and inflation have negative coefficient toward the real consumption with very lower vales(-0.0117 and -0.0105 respectively) in the long. There is established positive relationship between domestic currency depreciation and real consumption. The restrictive coefficient is -0.626 is also statically significant at the one percent of the significance level.

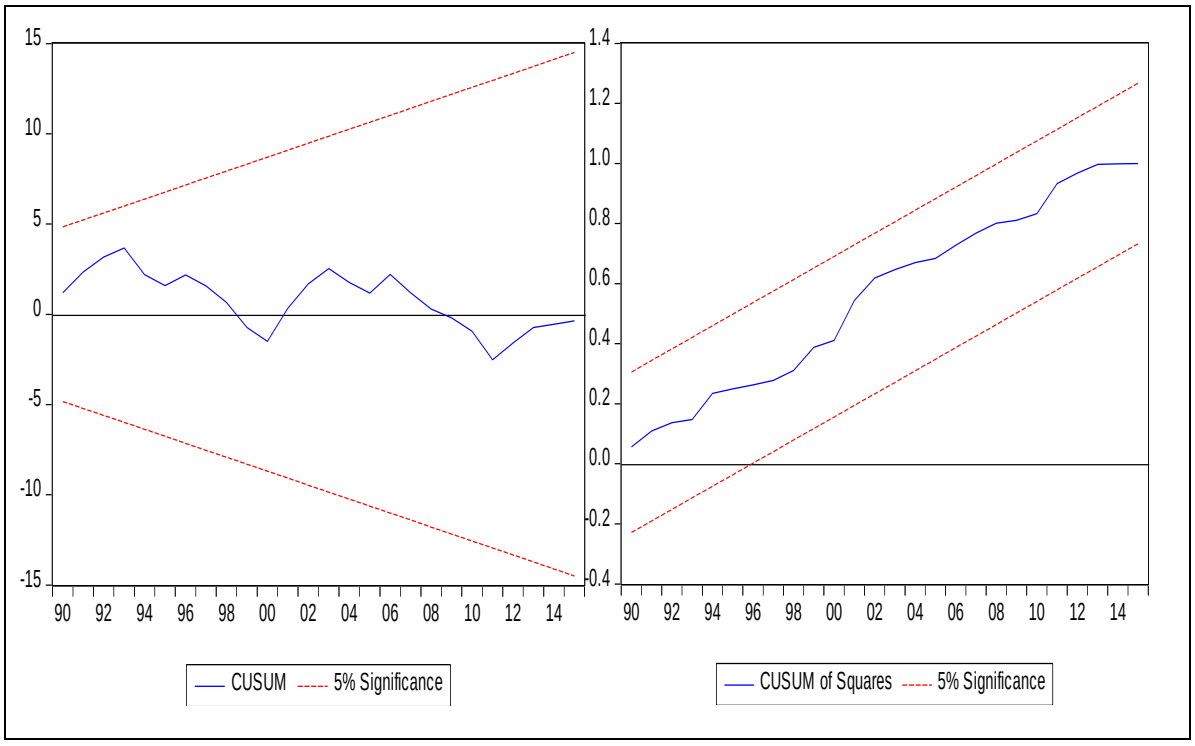
In the long run saving function as it is shown in the equation (VIII), it is clearly obtained that real income, and real exchange rate, inflation and real interest rate are statistically significant determinants of the long run saving functions. Marginal Propensity to save is 0.989, is positive and higher. The coefficient of the real exchange rate is positive (0.951) and higher also, expressed that there is inverse relationship existed between the domestic currency depreciation and real saving. In

the same way, the coefficient of inflation and real interest rate are positive and lower, are 0.075 and 0.0851 respectively.

4.2.2.4Stability Test: CUSUM and CUSUMQ

As it is prescribed in the sub point 3.7.2.4 of the research methodology in chapter three and the given statement of by Pesaran (1997). If the plot of CUSUM remains within the critical bounds at 5% significance level (represented by clear and straight lines drawn at 5%, the null hypothesis that all the coefficients and the error correction model are stable cannot be rejected. However, if the two lines are crossed, the null hypothesis of coefficient constancy can be rejected at 5%. The same analysis applies for CUSUMSQ test, which is based on the squared recursive residuals. CUSUM Test and CUSUMQ Test are represented now.

Figure No. 4.3: Stability Test of the Consumption Model

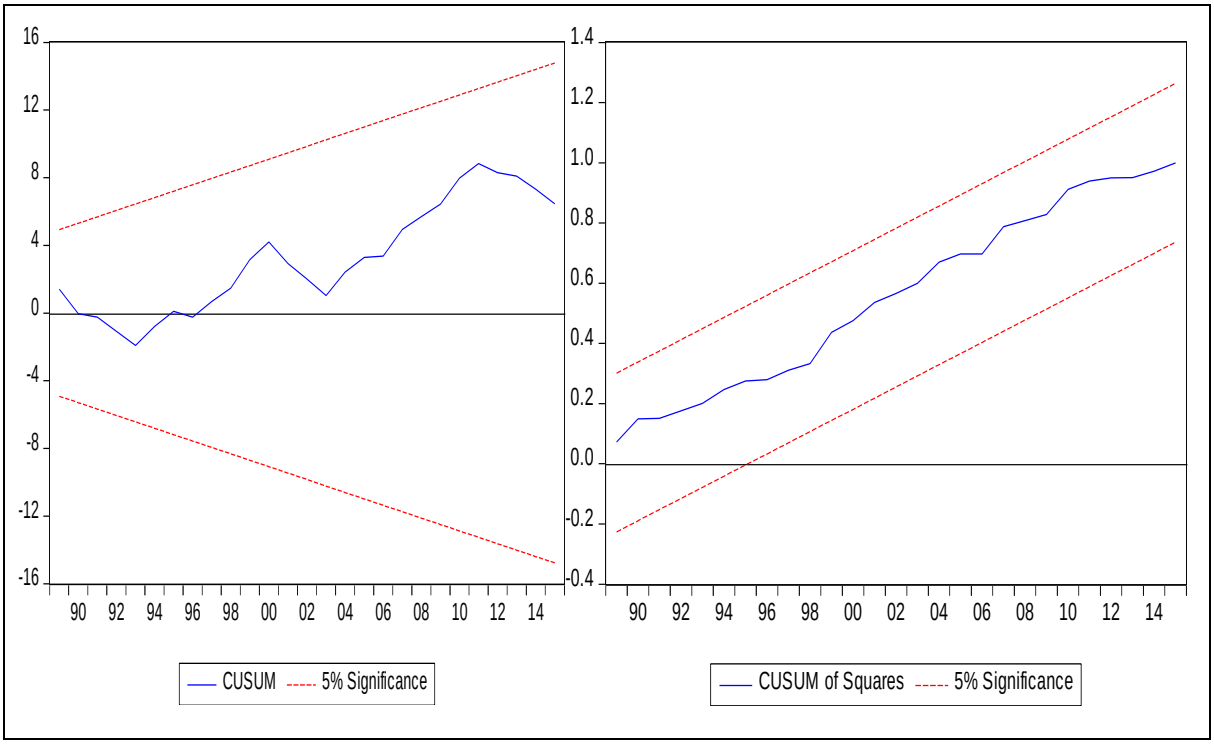


Source: Author's Calculation

The CUSUM test in the figure 4.2 reveals that the plot of CUSUM is situated in the 5 percent significance line. Which shows that the model, in the long run equilibrium and short run dynamics are stable situation. In the test of CUSUMQ of the same model also justifies that the plot of CUSUMQ is situated in the 5 percent significance

level or also can be said that the plots of CUSUMQ are within the parallel line or 5 percent of significance level prove the results CUSUM test.

Table 4.4: Stability Test of the Saving Model



Source: Author's Calculation

In the same way in the figure 4.4 shows that the stability condition of the saving model. The plot of CUSUM are within the 5 percent significance level. Therefor it can be said that the long run coefficients and short run dynamics of the saving model are stable. After the judging CUSUMQ result, it is also founded that the plot of the CUSUMQ falls within two parallel line or 5 percent significance level. It also shows that the model is stable for long run equilibrium as well as for the short run dynamics.

4.3 Co-integration/(Bound Testing) of ARDL Model for the Consumption and Saving Function

Co-integration test of the both model shows that is there any long run associations among the variables or not? It is also called bound testing in the ARDL model. For the checkout of the long run relationship of the consumption and saving with the independent variables, real income, real exchange rate, inflation and real interest rate. On the basis of the given F statistics of the consumption and saving with their lower

and upper bound values on the basis of the significance level, long run association is determined.

The Hypothesis in this bound testing are:

H_0=There is not long run relationship among the dependent and independent variables.

H_1 = There is long run relationship among the dependent and independent variables.

According to the appendix H and I, following summary table of the bound testing of the consumption model and saving model can be summarized here.

Table 4.5: Co-integration/ (Bound Testing) of the Models

Consumption Model			**Saving Model**	
F- Statistics Values	***5.077***		***4.23***	
Significance Level	Lower bound	Upper Bound	Lower Bound	Upper Bound
10 %	2.2	3.09	2.2	3.09
5%	2.56	3.49	2.56	3.49
2.5%	2.88	3.97	2.88	3.97
1%	3.29	4.37	3.29	4.37

Source: Appendices H andI

In the above summary table no.4.5, F –statistics values of the consumption and saving model are 5.077 and 4.23. The guideline says that the null hypothesis is rejected when F statistics is greater that the lower and upper bounds values. In the above summary table, it indicates the rejection of the null hypothesis for the consumption models at 10, 5, 2.5, and 1percent significance level. In thesame way, there is rejection of the null hypothesis or there is long run association among the variables for the saving model at the significance level of 10, 5 and 2.5 percentlevel of significance.

CHAPTER-V

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

The trend of the real income, consumption and saving are found in increasing trend; real interest and exchange rate are fluctuating more than other variables. The average value of the real interest rate is only 1.068 percent on an average. Average speed of the inflation is found 8.512 percent.All the variables are found skewed positively except real exchange rate. The variables real interest and inflation rate are leptokurtic whereas other are pletycurtic in nature. None of them are exactly bell shaped distribution

In the short run consumption function, if the real income (ΔlnY) increases by one percent, real consumption expenditure increases by 0.81 percent on an average. The coefficient of the real exchange rate is positive, it shows that there is inverse relationship between depreciation and real consumption in the short run. It is established inverse relation between the real consumption and depreciation of the domestic currencyin the short run.The coefficient of the inflation and real interest rate are very lowand significantly negative (-0.0058 and -0.0068). In the short run saving function analysis, it is found that real income, exchange rate, inflation and interest rate are statistically significant determinates. MPS in the short run is significantly found greater than unity (1.353). The coefficient of the real exchange rate is higher and negative (- 0.74), it means there is positive relationship found between real saving and depreciation of the domestic currency.

In the long run,real income increased by one percent, real consumption increased by 0.998 percent which is statistically significant at level of 1 percent significant level. Real interest rate and inflation have very low and negative coefficient (-0.0117 and -0.0105 respectively) toward the real consumption in the long. There is established positive relationship between domestic currency depreciation and real consumption. In the long-run saving function,real income, real exchange rate, inflation and real interest rate are statistically significant determinants. Marginal propensity to save (mps) is 0.989, is positive and higher. The coefficient of the real exchange rate is

positive (0.951) and higher also, expressed that there is inverse relationship existed between the domestic currency depreciation and real saving. In the same way, the coefficient of inflation and real interest rate are positive and lower (0.075 and 0.0851). Short run and long run equilibrium of the both model are also found stable.

5.2 Conclusions

This study aims to establish trend and nature of the real income, consumption, saving, exchange rate, inflation and interest rate; short run and long run consumption and saving function of Nepal and also explore the significance relationship among dependents and independents variables. On the basis of the above findings, main conclusions are highlighted in the following points:

i. The trend of the real consumption, saving and income are going upward from 1975 to 2015 Butreal exchange rate and real interest rate are fluctuating irregularly. Inflation rate is found on an average 8.512 percent. None of the variables are exactly bell shaped distribution.

ii. Real income, real exchange rate, inflation and real interest rate are significantly determinants of the short run and long run consumption and saving function of Nepal. MPC and MPS are higher (0.998 and 0.989) in the long run. Bhandari(2015) and Khan et al (2015) also had established that mpc of Nepal is higher. In spite of the result in the short run, there is positive relationship exited between real consumption and depreciation of the domestic currency, also supported by Devereux et al (2009) but these relationship are just apposite in the sh.The coefficient of short run, is quietly irrelevant. Real exchange rate is found higher in the short run and long saving function, where there are lower coefficients in the consumption function. Coefficient of the real interest rate and inflation aelower in the both model. They effect negatively on consumption, and positively on saving had already revealed by Gulfason(1979), Forgaha(2008) and Christensen (2012).

iii. There is the long run association established among the variables in the saving as well as consumption functions model.

5.3 Recommendations

On the basis of the above findings and conclusions, following recommendations can be proposed to the policy makers of the nation.

i. Anti- inflationary policy must be adopted so that the purchasing power of the people, real saving, consumption and real interest rate would be higher.

ii. It is found that MPC is higher in Nepal, domestic lead production policy should be adapted so that employment and output will increase and real GDP growth rate automatically goes up. It will also reduce the trade deficit and also reduces the unfavorable balance of payment of Nepal.

iii. As it is concluded that there is long run association among the dependent and independents variables, it suggests that there is appropriate environment of lunching plans and policies combining goods market and money markets.

APPENDIX A: RAW DATA

Rs millions

TIME	GDP	GDC	GDS	EXC	DFL	FDR1	CPI_Nepal	CPI_USA
1975	16,571.00	14,909.00	1,662.00	10.5	4.635	15	4.2	22.710513
1976	17,394.00	15,354.00	2,040.00	12.13	4.686	15	4.1	24.013422
1977	17,280.00	14,949.00	2,332.00	12.45	4.58	12	4.3	25.571043
1978	19,732.00	17,192.00	2,540.00	12.27	5.064	12	4.7	27.526579
1979	22,215.00	19,630.00	2,585.00	11.9	5.611	12	4.9	30.627736
1980	23,351.00	20,760.00	2,591.00	11.9	5.875	12	5.4	34.76535
1981	27307	24,333.00	2,974.00	11.9	6.307	12	6.1	38.351581
1982	30988	27,910.00	3,088.00	12.9	6.828	12.5	6.7	40.714275
1983	33,761.00	30,874.00	2,887.00	13.78	7.36	12.5	7.7	42.022195
1984	39,390.00	35,504.00	3,996.00	15.4	7.895	13	8.2	43.836406
1985	46587	40,348.00	6,239.00	17.83	8.335	13	8.5	45.397471
1986	55,734.00	49,847.00	5,887.00	19.85	9.527	12.5	9.8	46.241291
1987	63,864.00	56,543.00	7,321.00	21.59	10.72	12.5	11.2	47.97112
1988	76,906.00	69,302.00	7,604.00	22.21	11.99	12.5	12.4	49.89432
1989	89,270.00	79,120.00	10,150.00	25.53	13.35	12.5	13.4	52.302725
1990	103,416.00	95,273.00	8,143.00	28.54	14.78	11.5	14.7	55.126003
1991	120,370.00	108,856.00	11,515.00	31.85	16.13	11.75	16.1	57.46057
1992	149,487.00	133,277.00	16,207.00	42.59	19.18	12	19.5	59.200947
1993	171,474.00	148,214.00	23,172.00	45.49	21.16	12	21.2	60.948356
1994	199272	170,052.00	29,220.00	49.01	22.74	8.75	23.1	62.537548
1995	219175	186,710.00	32,465.00	49.7	24.17	8.75	24.9	64.291989
1996	248913	214,487.00	34,426.00	54.96	26.07	10.25	26.9	66.176518
1997	280513	241,351.00	39,162.00	56.75	27.94	10.25	29.1	67.72352
1998	300845	259,407.00	41,438.00	61.66	29.08	9.75	31.5	68.774778
1999	342036	295,473.00	46,563.00	67.63	31.65	8.375	35.1	70.279589
2000	379488	321,911.00	57,577.00	68.74	33.11	6.875	36.3	72.652831
2001	441,519.00	390,017.10	51,501.50	73.48	36.67	6.125	37.2	74.706124
2002	459,443.00	415,843.20	43,599.40	76.53	38.1	5.25	38.3	75.890987
2003	492,231.00	450,090.20	42,140.60	77.49	39.27	5	40.1	77.613784
2004	536,749.10	473,685.20	63,063.80	73.49	40.85	4.25	41.7	79.691689
2005	589,411.70	521,301.20	68,110.40	71.76	43.27	3.625	43.6	82.395426
2006	654,084.10	595,327.20	58,756.90	72.03	46.28	3.625	47.1	85.053457
2007	727827	656,374.40	71,452.50	70.2	49.65	3.625	49.8	87.479753
2008	815,658.20	735,469.90	80,188.30	64.72	52.4	4.25	53.2	90.838189
2009	988,272.00	895,042.00	93,230.00	76.58	60.84	5.75	59.9	90.515217
2010	1,192,774.0	1,056,185.00	136,589.00	74.24	69.53	8.125	65.6	91.999706
2011	1,366,954.0	1,176,030.00	190,923.00	72.03	77.12	8.125	71.9	94.903991
2012	1,527,344.0	1,359,538.00	167,805.00	80.32	82.18	*8.3125*	77.8	96.867874
2013	1,695,011.0	1,527,206.00	170,927.00	87.66	87.2	8.5	85.5	98.286826
2014	1964540	1,793,613.00	172,033	95.71	95.05	8	93.3	99.881258
2015	2120470	1,934,046.10	186,424	99.21	**100**	9	**100**	**100**

Source: Various quarterly economic bulletins, NRB and economic survey

APPENDIX B: PROCESSED DATA

Time	lnY	lnC	lnS	ln$	Π	R
1975	12.78692	12.6812262	10.48728	4.039118699	16.00	-1.00
1976	12.82437	12.6996221	10.6812	4.263307665	-2.38	17.38
1977	12.84075	12.6958437	10.83793	4.304566172	4.88	7.12
1978	12.87298	12.7351788	10.8229	4.2747468	9.30	2.70
1979	12.88904	12.7653337	10.738	4.309209186	4.26	7.74
1980	12.89293	12.7753177	10.69433	4.338760643	10.20	1.80
1981	12.97836	12.8630516	10.76113	4.31504539	12.96	-0.96
1982	13.02549	12.9208763	10.71941	4.361698553	9.84	2.66
1983	13.03621	12.9468158	10.57712	4.320195861	14.93	-2.43
1984	13.12019	13.0163256	10.83197	4.410698013	6.49	6.51
1985	13.23376	13.0899838	11.22326	4.556272676	3.66	9.34
1986	13.27939	13.1677589	11.03155	4.539694755	15.29	-2.79
1987	13.29769	13.1759334	11.13168	4.526915626	14.29	-1.79
1988	13.37134	13.2672263	11.05743	4.492753422	10.71	1.79
1989	13.41322	13.2925245	11.23903	4.601647996	8.06	4.44
1990	13.45854	13.3765226	10.91693	4.673080651	9.70	1.80
1991	13.52251	13.4219638	11.17559	4.733317077	9.52	2.23
1992	13.56634	13.4515609	11.34457	4.862142551	21.12	-9.12
1993	13.6053	13.4595276	11.60382	4.873518215	8.72	3.28
1994	13.68366	13.5250975	11.76385	4.88795889	8.96	-0.21
1995	13.71786	13.5575457	11.80815	4.854572165	7.79	0.96
1996	13.76914	13.6202894	11.79085	4.906805055	8.03	2.22
1997	13.81939	13.6690184	11.85047	4.883351021	8.18	2.07
1998	13.84948	13.7012877	11.86709	4.90248496	8.25	1.50
1999	13.89321	13.7468754	11.8991	4.908331959	11.43	-3.05
2000	13.95181	13.7872652	12.06611	4.924205882	3.42	3.46
2001	14.00118	13.877148	11.85257	4.994266568	2.48	3.65
2002	14.00271	13.9030069	11.64774	5.021530849	2.96	2.29
2003	14.04131	13.9518126	11.58338	5.010517604	4.70	0.30
2004	14.08853	13.9635432	11.94715	4.944813514	3.99	0.26
2005	14.12457	14.0017709	11.96657	4.909799994	4.56	-0.93
2006	14.1615	14.0673708	11.75167	4.868089657	8.03	-4.40
2007	14.19796	14.0946256	11.87693	4.8147407	5.73	-2.11
2008	14.25798	14.1544921	11.93836	4.705091652	6.83	-2.58
2009	14.3007	14.201613	11.93981	4.751177418	12.59	-6.84
2010	14.35525	14.2336296	12.18819	4.64551277	9.52	-1.39
2011	14.38793	14.2374921	12.41946	4.554672189	9.60	-1.48
2012	14.43532	14.3189354	12.22684	4.605225153	8.21	0.11
2013	14.48014	14.3758928	12.18593	4.612839323	9.90	-1.40
2014	14.54154	14.4505149	12.10622	4.629484738	9.12	-1.12
2015	14.56715	14.4751248	12.13578	4.597238816	7.18	1.82

Source: Author's calculation

APPENDIX C: DESCRIPTIVE ANALYSIS OF THE VARIABLES

Variables	Mean	Median	Skewness	Std. Dev.	Kurtosis	Observation
Y	10002433	906965.4	0.54	527226.4	2.16	41
C	890892.2	772622.4	0.59	475605.5	2.26	41
S	111684.6	114432.7	0.33	56676.19	2.2849	41
Π	8.512	8.247	0.353	4.28	4.0567	41
$	108.02	104.12	-0.061	26.09	1.81	41
R	1.068	0.957	1.024	4.47	6.23	41

Source: Author's calculation

Note: The Variable C, S, and Y are in millions; $ is the ratio of one dollar to the Nepalese Rupees in real term and Π is the cpi inflation of Nepal.

APPENDIX D:ARDL MODEL FOR CONSUMPTION FUNCTION

Dependent variable: LNC

Maximum dependent lags: 4

Dynamic regressors (4 lags, automatic): LNY LN$ ΠR

Fixed regressors: C

Model selection method: Akaike information Criteria (AIC)

Selected model: ARDL (4, 0, 2, 0, 0)

Variable	Coefficient	Standard Error	t-statistic	Probability
LNC(-1)	0.27	0.11	2.395	0.024
LNC(-2)	0.301	0.128	2.35	0.026
LNC(-3)	-0.165	0.137	-1.49	0.146
LNC(-4)	-0.165	0.106	-1.54	0.133
LNY	0.793	0.106	7.43	0.0000
LN$	0.099	0.047	2.077	0.047
LN$(-1)	-0.069	0.065	-1.057	0.299
LN$(-2)	-0.139	0.053	-2.606	0.014
R	-0.0093	0.00216	-4.307	0.0002
Π	-0.0084	0.00019	-4.29	0.0002
C	0.497	0.150	3.300	0.0028

R-squared	0.999
Adjusted R-squared	0.999
Standard Error of Regression	0.0143
F-statistics	4510.49
Probability (F-statistics)	0.000000
Akike Information Criterion	-5.41
Schwartz Criterion	-4.93
Durbin-Watson Statistics	1.88

Source: Author's calculation

APPENDIX E: Diagnostic Test for the Consumption Model

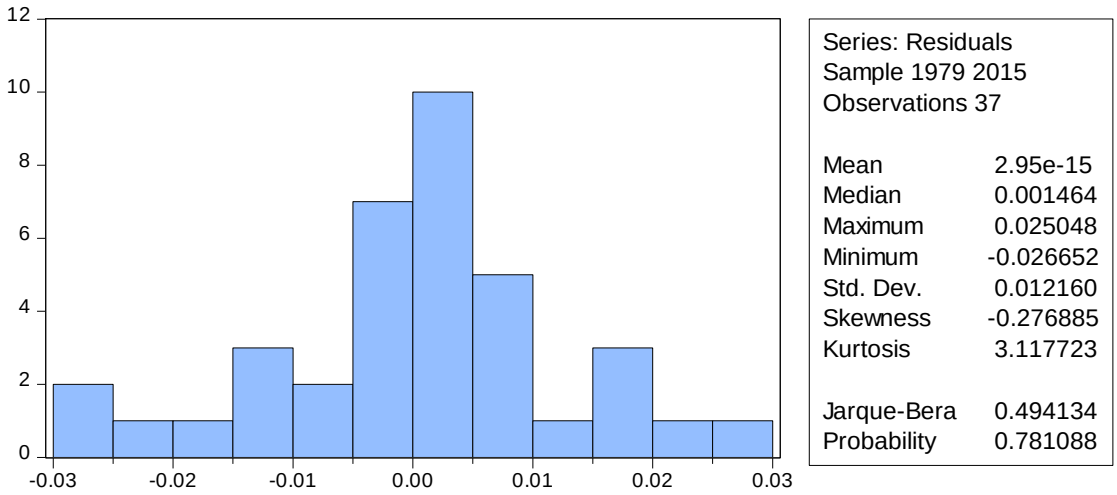
1. Breusch – Godfrey Serial Correlation LM Test

Lag	F-statistics	Observe R-square
1	0.168 (0.685)	0.247(0.6191)
2	0.195(0.823)	05923(0.743)

2. HeteroskedasticityTest :Breusch-Pagan- Gofrey

F statistics	Observe R-square	Scaled Explained SS
0.365(0.950)	4.55 (0918)	2.38 (0.9925)

3. Normality Test :Jarque – Bera Test



4: Ramsey RESET Test

Specification: LNCX LNC(-1) LNC(-2) LNC(-3) LNC(-4) LNY LN$ LN$(-1) LN$(-2) Π R C		
Lag	F- Sstatistics	Probabilty
1	0.5407	0.469
2	0.9877	0.387

Source: Author's calculation

APPENDIX F: ARDL MODEL FOR SAVING MODEL

Dependent variable: LNS

Maximum dependent lags: 3

Dynamic regressors(3 lags, automatic): LNY LN$Π R

Fixed regressors: C

Model selection method: Akaike information Criteria (AIC)

Selected model: ARDL (3, 3, 2, 0, 0)

Variable	Coefficient	Standard Error	t-statistic	Probability
LNS(-1)	0.504	0.142	0.0016	0.956
LNS(-2)	0.0359	0.180	0.199	0.844
LNS(-3)	-0.263	0.149	-1.757	0.0911
LNY	1.57	1.068	1.47	0.153
LNY(-1)	-1.28	1.33	-0.958	0.346
LNY(-2)	2.912	1.374	-2.118	0.044
LNY(-3)	3.333	1.184	2.81	0.0094
LN$	-0.740	00.39	-1.89	0.069
LN$(-1)	0.52	0.53	0.98	0.0335
LN$(-2)	0.910	0.411	2.209	0.036
LN$(-3)	1.344	0.4865	2.7628	0.0133
LNR	0.820	0.29951	2.744	0.0139
Π	0.0545	0.0147	3.690	0.0011
R	0.0612	0.0156	3.915	0.0006
C	-5.076	1.248	-4.067	0.0004

R-squared	0.9821
Adjusted R-squared	0.9632
Standard Error of Regression	0.0990
F-statistics	51.941
Probability (F-statistics)	0.0000
Akike Information Criterion	-1.4802
Schwartz Criterion	-0.644
Durbin-Watson Statistics	1.7994

Source: Author's calculation

APPENDIX G: DIAGNOSTIC TEST FOR SAVING MODEL

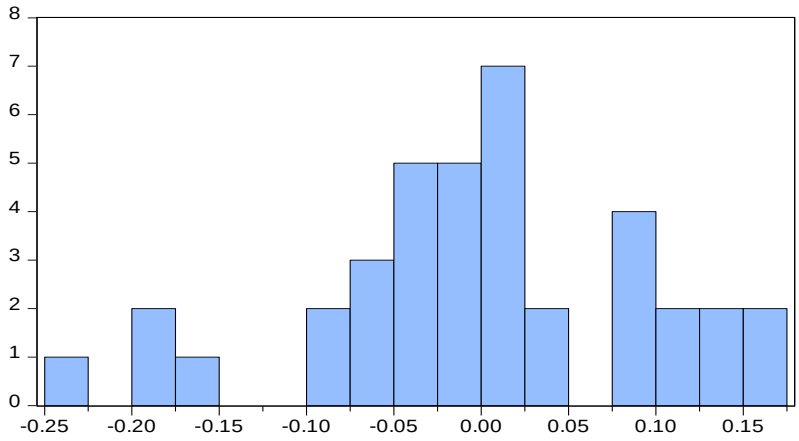
1: Breusch – Godfrey Serial Correlation LM Test

Lag	F-statistics	Observe R-square
1	0.494 (0.488)	0.767 (0.381)
2	0.431 (0.654)	1.373 (0.503)

2. HeteroskedasticityTest :Breusch-Pagan- Gofrey

F statistics	Observe R-square	Scaled Explained SS
0.269 (0.989)	4.351 (0.97)	1.938 (0.99)

3. Normality Test: Jarque – Bera Test



Series: Residuals
Sample 1978 2015
Observations 38

Mean	-8.34e-15
Median	-0.001954
Maximum	0.171422
Minimum	-0.233790
Std. Dev.	0.095665
Skewness	-0.357761
Kurtosis	3.058218
Jarque-Bera	0.815989
Probability	0.664982

4: Ramsey RESET Test

Specification: LNS LNS(-1) LNS(-2) LNS(-3) LNY LNY(-1) LNY(-2) LNY(-3) LN$ LN$(-1) LN$(-2) Π R C		
Lag	F- Sstatistics	Probabilty
1	5.0515	0.034
2	2.456	0.1079

Source: Author's calculation

APPENDIX H: BOUNDTESTING/(COINTEGRATION) OF CONSUMPTION MODEL

Test Statistics	Value	K
F- statistics	5.077	4

Critical Value Bounds

Significance	Lower Bound	Upper Bound
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.97
1%	3.29	4.37

Source: Author's calculation

APPENDIX I: ARDL BOUND TESTING/ (COINTEGRATION) FOR SAVING MODEL

Test Statistics	Value	K
F- statistics	4.23	4

Critical Value Bounds

Significance	Lower Bound	Upper Bound
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.97
1%	3.29	4.37

Source: Author's calculation

APPENDIX J: ECM/SHORT RUN DYNAMICS CONSUMPTION MODEL

Variable	Coefficient	Standard Error	t-statistics	Probability
D(LNC(-1))	0.050	0.0788	0.644	0.525
D(LNC(-2))	0.367	0.803	4.42	0.0002
D(LNC(-3))	0.178	0.117	1.511	0.142
D(LNY)	0.811	0.0977	8.307	0.0000
D(LN$)	0.102	0.041	2.445	0.0215
D(LN$(-1))	0152	0.053	2.83	0.0087
D(Π)	-0.0058	0.00267	-2.143	0.0416
D(R)	-0.0068	0.0026	-2.576	0.0160
CointEq(-1)	-0.8095	0.1413	-5.7288	0.0000

Source: Author's calculation

APPENDIX K: LONG RUN EQUILIBREUIMFOR THE CONSUMPTION MODEL

LNC = 0.626 +0.9981*LNY-0.1379*LN$ - 0.0106*Π – 0.0117*R

Variable	Coefficient	Standard Error	t-Statistics	Probability
LNY	0.998	0.01016	98.188	0.0000
LN$	-0.1379	0.025	-5.45	0.00000
Π	-0.01058	0.00228	-4.622	0.0001
R	-0.01171	0.00246	-4.7476	0.0001
C	0.6262	0.182	3.437	0.002

Source: Author's calculation

APPENDIX L: ECM/SHORT RUN DYNAMICS FOR SAVING MODEL

Variable	Coefficient	Sta. Error	t-statistics	Probability
D(LNS(-1))	0.224	0.132	1.69	0.1033
D(LNS(-2))	0.259	0.1337	1.89	0.0704
D(LNY)	1.5336	0.728	2.106	0.0454
D(LNY(-1))	-0.3923	0.768	-0.496	0.623
D(LNY(-2))	-3.319	0.768	-4.32	0.0002
D(LN$)	-0.746	0.33	-2.258	0.0329
D(LN$(-1))	-0.9213	0.379	-2.43	0.0226
D(Π)	0.049	0.022	2.216	0.0360
D(R)	0.0568	0.0219	2.595	0.0156
CointEq(-1)	-0.70218	1.753	-4.0045	0.0005

Source: Author's calculation

APPENDIX M: LONG RUN EQUILIBRIUM OF THE SAVING MODEL

LNS = -7.02 +0.989*LNY +0.9519*$ +0.0754* Π +0.0847*R

Variable	Coefficient	Standard Error	t-Statistics	Probability
LNY	0.9891	0.09089	10.8829	0.0000
LN$	0.9518	0.24862	3.828	0.0008
Π	0.0754	0.0246	3.0611	0.0052
R	0.0847	0.025	3.364	0.0025
C	-7.0218	1.753	-4.0045	0.0005

Source: Author's calculation

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