# CHAPTER - I

# INTRODUCTION

## 1.1 Background of the Study

Foreign aid can be defined as economic assistance from one country to another, the recipient typically being a least-developed country (LDC). Aid is usually intended either to provide humanitarian relief in emergencies, to promote economic development, or to finance military expenditure. Aid may take the form of outright gifts of money, which may be tied to purchases from the donor, or untied and available for expenditure anywhere. It may take the form of soft loans, on terms easier than those available to the borrower in world capital markets. Aid may also be given in kind, including food, plant and equipment, military supplies or technical assistance (Pearce, 1996).

Official Development Assistance (ODA) is defined as government aid designed to promote the economic development and welfare of developing countries. Loans and credits for military purposes are excluded. Aid may be provided bilaterally, from donor to recipient, or channeled through a multilateral development agency such as the United Nations or the World Bank. Aid includes grants, "soft" loans and the provision of technical assistance. Soft loans are those where the grant element is at least 25 percent of the total (OECD, 2010). The broader definition of Foreign aid subsumes all money classified as official development assistance and further incorporates military assistance, political development programs, export promotion, debt forgiveness and non-concessional lending by all bilateral and multilateral organizations. Foreign aid itself can be distinguished into various categories based on its purpose and effects, intended upon the recipient country. Financial assistance could be disbursed for various reasons including strategic, political, economic or cultural reasons, which in turn is used as a basis to differentiate various types of donors.

Foreign aid is a policy of giving financial and technical aid to other countries, such as policy may be undertaken for various reasons; emergency relief in time of war, famine, flood or other disaster, military aid for defense against a common enemy; enlightened self-interest, that is building up a poor country in order to improve one's

own commerce or to help world trade in general. Aid take a variety for forms; direst gift of money and equipment, short term or long term loans, with or without specific conditions of use and or terms of repayment, technical assistance and training programs, aid for particular projects or for broad development programs; sales of surplus food and other goods at advantageous prices (Pearce, 1996).

However this general concept of foreign aid is not sufficient in itself. Many writers and many national and international institutions have given various definitions regarding the philosophy of foreign aid. Rosenstein Rodan said that, "Aid refers only to those parts of capital inflow which normal market incentive do not provide. It consists of long terms loans, grants, soft loans, sale of surplus products for currency payment and technical assistance"(Pearce, 1996).

Whatever way foreign aid is defined, it does not make any difference because its main theme is economic aid or external assistance or economic assistance. It is generally intended either to provide humanitarian relief for the country or for accelerating economic growth or development mainly in developing the LDCs, where the development process is not moving smoothly. This sort of assistance consists of grants, loans, technical assistance etc. and can be provided either multilaterally or bilaterally. Where bilateral aid is offered directly on government to government basis and multilateral aid is channeled through international aid providing agencies such as IBRD, IDA and OPEC, etc. In bilateral aid assistance will be receive from the individual donors, where as in the case of multilateral aid or assistance will come from international agencies. Likewise aid extended by non-governmental organization or individual is called private aid (Phull, 2007).

There are two components of foreign aid: grants and loans. Grants component of aid are free resources for which no repayment is required. A loan with at least 25 percent of grant component is considered as foreign aid. Grant components are measured in terms of interest rate, maturity and grace period (interval to first payment of capital) of a loan. It measures the concessionary of loan in the form of present value of an interest rate below the market rate over the life of loan.

Foreign aid is classified into various forms on the basis of its nature, terms, conditions and sources. From the point of view it is categorized as (a) Capital aid, (b)

Commodity aid , and (c) Technical aid. Capital aid refers to the provision of capital in cash or in kind for the implementation of projects as well as which supports balance of payment (BoP). Commodity aid usually takes the form of transfer of surplus product of the donor to recipient countries. Technical aid involves the training of the recipients national and provision of skilled foreign personnel expert to carry out the required development tasks in the recipient country. Financial aid takes the form of either grants or loans. Grants are usually gifts. They do not have repayment liability so they should be used in the projects with long gestation period such as social services. Loans on the contrary have to repay. It generates the reserve flow from the recipient countries. Loans is of three types according to the period of maturity, they are; long terms, mid-term and short term. According to hardness loans are generally two type's therefore soft loan and tied loans are differed according to the interest rate charged per annum and provision of payback period.

Regarding tied and untied aid, tied aid is conditional aid and untied aid is unconditional or free from the tied strings. Regarding motives, it is provided for different purpose such as humanitarian, political, strategic and economic motives.
In initial stage of development, foreign aid is indispensable. It is an economic necessity. Even the highly developed countries of present took foreign aid in the initial stage of their development. They are the countries like the  UK, the USA, Russia, Japan and European countries.

The final aim of foreign aid is to accelerate the development activities and try to make country self-standing. There is such condition that general expenditure is increasing and as result internal resources are not sufficient. That is why foreign aid is necessary for supporting developmental expenditure. Therefore in the present context there is lack of resources. There is compulsory and obligatory need of foreign aid for development of Nepal.

Developing countries like Nepal are characterized as capital poor or low investing economy. The appearance of inflationary pressure is the evitable in developing countries because of existence of disequilibrium between demand and supply of domestic products. Foreign aid is advantageous to minimize such inflationary pressure.

Nepal is a landlocked country situated in South Asia and bordered to the North by China and the South, East, and West by India. It is also known as the land of the Mount Everest and the birth place of Lord Buddha. The altitude ranges from 70 meters to 8848 meters and the climate varies from tropical to arctic depending upon altitude. Geographically, the country is divided into three East-West ecological belts: the Northern Range – Mountain, the Mid-Range – Hill and the Southern Range – Terai (flat land). It has an area of 147181 sq. km with approximately three quarters covered by mountains. It has a population of about 28 million with an annual average rate of population growth of 1.35 percent at present (CBS, 2016). Service sector dominates the contribution to GDP with 53.2 percent followed by agriculture (32.3 % ) and industry by 14.5 percent. Nepal has been receiving development assistances for more than six decades and aid continues to play an important role in the socio-economic development of the country. The volume of aid commitments from development partners has been increasing over the years (MoF, 2016). The devastating earthquake of April 25 and May 12, 2015 further geared up the need of external assistance to supplement the government's efforts of supporting to the rehabilitation and reconstruction works.

Official Development Aid (ODA) represents in average about 20 percent of the national budget over the last 5 years. The estimated GDP for FY 2014-15 was US$ 21.2 billion whereas the total government expenditure was estimated to be about US$ 6.2 billion which is about 29.1 percent of GDP. The internal revenue collection was estimated to be US$ 4.2 billion which is about 19.8 percent of GDP. Foreign aid was estimated to account for about 5.7 percent of GDP in FY 2014-15. Similarly, total receipts from remittances exceeded about US$ 5.9 billion which is about 28 percent of GDP in FY 2014-15. Currently, Nepal has the per capita GDP of US $ 762 per annum. The percentage of people living below the poverty line fell from about 42 percent of the population in FY 2003-2004 to 23.8 percent in FY 2014-2015. However, this could raise in the coming years due to the adverse effect of April 2015 earthquake in Nepal (CBS, 2016).

The first Foreign Aid Policy of Nepal was formulated in 2002 with a view to responding to policy gap in area of aid management. With fast changing aid dynamics, 2002 policy needed to be updated in line with contemporary principles and

the best practices widely adopted in global aid architecture. With a view to responding to the demand of the time shaped by global commitments towards aid and development effectiveness and by Nepal's goal of graduating from its current status of 'Least Developed Country' by 2022, the Government of Nepal prepared a development cooperation policy and circulated among wider mass. After long public circulation, series of consultations with the stakeholders, including Development Partners' and civil society, and close scrutiny of the Cabinet, the new Development Cooperation Policy, 2014 came into effect on 26 June 2014. The ultimate goal of this policy is to build a self-reliant economy and transform Nepal into a prosperous democratic country through the effective mobilization of development cooperation (MoF, 2014).

The challenge of economic development has been further complicated by its limited or almost untapped natural resource endowment, the landlocked location and rugged terrain and social infrastructure. Its investment needs for infrastructure development, thus, are quite substantial. But at the same time public funds available for infrastructure investment are limited. The fiscal resources base of the country is small but unlikely to grow rapidly. This leaves government highly dependent on outside official development assistance. Fortunately, international donors and development partners have been quite supportive of its development plans and programs.

In 1950 with the dawn of the democracy Nepal started building relationship with foreign countries. After signing the point four programs with USA in January 23, 1951 the government of Nepal started receiving foreign aid. Nepal has been receiving foreign aid mostly form 'Nepal aid group', which includes nations like Australia, Belgium, Canada, Denmark, Finland, Norway, Germany, Kuwait, Netherlands, Switzerland, Sweden, the UK, the USA, Japan and multilateral donors as IDA, IMF, EU, UNCATAD, ADB, UNDP, the World Bank, WHO, UNICEF, OPEC. It is found that foreign aid has been playing foremost role in the development of a developing country like Nepal. Democratic practice along with development and construction started in Nepal after the rise of democracy in 1950. Still and before in all development plans the foreign aid is playing a vital role in the development of field such as road, irrigation, communication, hydroelectricity, education, drinking water,

agriculture and health. Foreign aid also helped to increase the productivity and production to expand the development works and to find out suitable technologies.

Nepal faces severe problems of deficiency in resource mobilization due to low saving and high consumption ratio. Above all there is serious resource gap problem in Nepal. Therefore, fiscal deficit is growing yearly. So, in this context huge amount of foreign aid in the form of capital as well as financial and technical assistance is needed to solve these problems. Without foreign aid development seems impossible.

## 1.2 Statement of the Problem

Foreign aid has been the major source of development found for the majority of developing countries. Nepal rely heavily on the foreign assistance; two third of country's development expenditure or about one third of the country's total budget is found by foreign aid (Tiwari, 2007, p.2). Being a poor country, Nepal is trap in a "vicious circle of poverty". It is low level of living standard, productivity, high rate of unemployment, low level of ability to tax pay, high gap between revenue and expenditure, low level of saving, low level of investment, and high dependency on traditional agricultural system and so on. In the critical economic condition, foreign aid is playing crucial role in the overall development of friendly Nepalese economy.

In 2000, the United Nations General Assembly adopted the Millennium Declaration, laying the foundations for the Millennium Development Goals (MDGs). To achieve the SDGs, donors acknowledge a "global partnership for development". In fact, such global partnership predominantly involves in increasing Official development Assistance (ODA) and granting debt relief to free resources for social spending (United Nations General Assembly, 2016). Many countries are facing different crisis.

Nepal is one of among them and we cannot escape from the crises. Though, Nepalese economy is characterized as agriculture base economy and the agriculture prospective plan (PPP) on the tenth plan have focused on commercialization of the agricultural by cultivating higher value crops and creating conducting environment for the participation of irrigation sector and reducing poverty by increasing agriculture production and creation of employment opportunities. The Three-Year Interim Plan ( FY 2007/08-2009/10 ) target to attain 3.6 percent of national agriculture growth rate. Starvation, poverty and unemployment are current issues of present global economic

scenario. Nepalese agriculture production has not shown sufficiently increase in crop production to fulfill the demand for growing population. In Nepal last **five** years, there was high fluctuations in food production. In FY 2006/07 it decrease by 4.3 percent compared to previous year's production and it has preliminary estimation a rise by l0.l percent compare to previous fiscal year's production due to favorable climate condition, while population growth rate is 1.35 percent (CBS,2011), Our agriculture system is traditional and most of the crops production is based on favorable monsoon. To overcome the low level of productivity there is necessity to improve in fanning system and change in technology. To escape from the starvation, poverty and unemployment there is need to increase productivity in agriculture, which requires more capital investment and technological improvement. In the stage of development, foreign aid can plays vital role for every country's fulfill the essential requirements such as machinery, fertilizer, improved seeds also technology as well as modern tools. Nepal is a least developed country is getting aid from different countries and organization in the form of bilateral and multilateral assistance. Despite the huge amount of aid, the agricultural sector has not improved satisfactory. The present study asses the share of foreign aid in agriculture sector of Nepal.

Foreign aid is being received by Nepal since 1951 for economic development of the people. There is no doubt that foreign aid has been playing crucial role for economic process, if foreign aid has been used properly, transparently, coordinately with the full co-operation of the people of targeted group. However, there are many problems in effective use of foreign aid by developing countries like Nepal. Political instability, corruption and nepotism are core cause of ineffectiveness of foreign aid and Nepalese economic development. However, they are other major factors, which they can effectively role-play to create the weakness of economic and agriculture development.

The system of foreign aid is deviating from its track. The donor countries and donor agencies have used their aid for fulfillment of their stake through various conditionality. Likewise, they are provided loans, not on the interest of particular communities but on the interest of themselves. It is argued that large amount of foreign aid follows back to donors in the form of compensation to the expatriate consultants and imports of equipment and the bureaucrats, project staffs and political

leaders siphon large portion of aid, before it reaches to the targeted group. On the other hand, commitment disbursement gap is also wide and donors lobby to appoint incompetent personnel to work in developing countries as experts. Therefore, for successful implementation of aid-financed projects such weaknesses have to be addressed. Hence, the main reachable questions in this study are:

i.     What are the trends of foreign aid, GDP and bilateral and multilateral aid?

ii.    Do bilateral and multilateral aid effects on the level GDP of Nepal?

## 1.3 Objectives of the Study

The main purpose of this study is to examine the role of foreign aid in Nepalese economy through development process by examining its effect on GDP growth with special reference to keeping in view the above stated problem. This study also investigates the contribution of foreign aid to the GDP and the trends of foreign aid. The study attempts to following

Objectives:

i.     To explore the trend of foreign aid, bilateral and multilateral aid and GDP.

**ii.**    To show the effects of bilateral and multilateral aid on GDP.

## 1.4 Significance of the Study

This study seeks to analyze the importance and effect of foreign aid in Nepalese economy. Hence, this research work is useful to those who are interested in this field. Nepal is one of the poorest countries among the world. Nepalese economic scenario is actually poor condition. In this country's population, growth is high which is direct related to the national economy. On the other hand, the population growth rate is increase tremendously; national politics is unstable which creates the degrading situation of economy. Because of the national economic policy is dependence on their political strategy, which is unstable. Due to the unstable government, economic policy and their different foreign policy affects the GDP growth rate.

Number of research study on foreign aid has already been workout from other different aspects but there is no any specific latest research for the foreign aid on agriculture sector. This research work inspired by the poor economic condition and food crises of Nepal. And it is also true that, different countries provides high amount of foreign aid and grants as the form of bilateral and multilateral for the purpose of economic reformation with different sectors. Even though our country's economy is becomes poor under the high rate of foreign aids. Moreover, there is no any specific

changed in agriculture sector by the high amount of foreign aid. Nepalese economy is agriculture based but most of the population have been face food crises, starvation and so on every year. Therefore, under the receiving of high amount of foreign aid for strong economic build-up but on the other hand, near about more than thirty percent people have been faced starvation and food crises. Therefore, this study seeks to analyze the contribution of foreign aid in Nepalese economy especially on agriculture sector. This study will further examine and analyze the importance and effect of foreign aid for developed Nepalese economy. Hence, this research study will be useful to those who are interested in this field and economic researchers also policy makers. It supports to choose type of aid as loan and grant and bilateral or multilateral and tied or untied which will definitely help to improve the macro economic variables of the

Nepalese economy.

This research study may be equally useful to the rational planners, researchers as it may provide guidelines for the economic planners and policy makers to decide whether to collect more aid of given allocation for its proper utilization. This study clearly shows the impact of foreign aid in the process of agriculture and sound economic development. Therefore, if its impact is positive then the government should not hesitate to sign for more aid. Instead, if the net impacts are negative, then it is better not acquire more aid.

## 1.5 Limitations of the Study

The study has following inherent limitations.

  i. This study  covers the time series data in between FY 1990/91 to 2015/16.
 ii. GDP implicit price deflator was used to convert nominal data of all required variables into real figures.
iii. Secondary data is used to study different variables.

## 1.6 Organization of the Study

The present study consists of six chapters to make it more systematic. The very beginning part of the study is the preliminaries i.e. the title and others. The first

chapter deals with background of the study, statement of the problem , objectives of the study, significance of the study, study limitations and organization of the study.

The second chapter presents theoretical framework of the study. It also deals with an extensive review of literature regarding international and national context covering cross country studies as well as country case studies.

The third chapter explains research methodology. It includes research design, sample period, sources of data, sample size, estimation procedures, time series properties and data and measurement issues along with detail discussion on specification of models and definition of variables.

The fourth chapter describes overall historical trends of economic growth in Nepal. Never the less, both dependent and explanatory variables are explained with descriptive statistics. Different econometric tools and techniques of data analysis are used to establish the linkage between variables.

The fifth chapter summarizes major findings, conclusions, and recommendations. References and appendices are included at the end of the report.

# CHAPTER- II

# REVIEW OF LITERATURE

This literature review surveys the existing theoretical bases to foreign aid and economic growth both at aggregate and disaggregates levels. It discusses empirical literature on foreign aid and economic growth nexus at international and Nepalese context. Finally, on the basis of existing literature review, it presents importance of conducting this type of study in context of Nepal.

## 2.1 Theoretical Approaches of Foreign Aid

Savings and investment are considered as the two principal drivers of economic growth and development of an economy. There are four basic approaches which help to analyses the transmission mechanism of foreign aid that supports the development process of the recipient countries (Phull, 2007). These are:

  i.     Saving-Investment Gap Approach
  ii.    Foreign Exchange Earning-Expenditure Gap Approach
  iii.   The Fiscal Gap

## i  Saving-Investment Gap Approach

The savings–investment gap approach is based on the Harrod-Domar growth models and follows the footsteps of Rosenstein Rodan's 'Big Push' theory. Harrod-Domar growth model concentrates on the assumption that in a dynamic economy aggregate savings must be equal to the aggregate investment. The central argument of this model is to maintain a steady rate of growth which combines both multiplier and accelerator principles to determine the rate of growth of income that assumes ex ante saving must be equal with ex ante investment. The Harrod-Domar growth model assumes that domestic savings (S) is a constant proportion (s) of the national income (Y):

$$S = s\,Y \tag{2.1}$$

This model assumes investment (I) is a change in the total capital stock (K) which is based on the acceleration principle assuming to be a constant proportion of the rate of growth:

$$I = \Delta K = k(Y - Y_{t-1}) \tag{2.2}$$

$$I = \Delta K = k\,\Delta Y \qquad \text{Where, } \{(Y - Y_{t-1}) = \Delta Y\} \tag{2.3}$$

Here, k stands for the incremental capital-output ration and $\Delta$ shows a change in the variable. By dividing equation (2.3) with Y,

$$\Delta K/Y = k\,(\Delta Y/Y) \tag{2.4}$$

By substituting $\Delta K$ for I, we can rewrite equation (2.4) as:

$$I/Y = k\,(\Delta Y/Y) \tag{2.5}$$

Again by substituting $(\Delta Y/Y)$ as g the rate of growth of output in equation (2.5), we can rewrite it as;

$$g = (I/Y)\,(1/k) \tag{2.6}$$

Based on the assumption that production function is fixed in proportion and k is fixed as capital. Scarcity of capital is a major obstacles in the path of higher economic to growth. According to Rostow (1956) investment will bring the momentum for 'take-off' developing countries by 'a rise in the rate of productive investment from 5 percent or less to over 10 percent of national income' (Mukherjee, 2015). On the assumption of Harrod-Domar model the ex-ante savings is equal to ex ante investment we can deduce using equation (2.5) and (2.6) that:

$$g = s/k \tag{2.7}$$

The countries which are able to save a higher proportion of income could grow at a much faster rate than those that save less, this saving income difference can be filled through foreign aid. Moreover, this growth would be self-sustaining. On the basis of the above formulation a developing country can fix a target rate of income growth, such as g*, and hence determine the level of investment required to achieve that rate. If domestic saving generated cannot meet the required investment to achieve the targeted growth, then a saving constrain will exist over the time. This is a particular

feature of most of the developing countries where a relatively low level of investment causes due to their inability to generate more domestic saving. It is often found that private capital in any single industry in developing countries is unlikely to be financially attractive because the small size of the market for its product. A reason for less private capital inflows, especially foreign direct investment would be the cause of limited opportunities for profit that sustain the level of investment. Hence, given that domestic saving are low and prospects for private foreign investment, the rationale of foreign aid is justified to substitute for these deficiencies. This would help the country from capital scarcity. Denoting *a* as the proportion of foreign capital inflows in the form of foreign aid to national income, the targeted growth rate will be given by:

$$g^* = (s+a)/k \qquad\qquad (2.8)$$

Thus, this justifies one of the reasons for massive capital transfer and technical assistance in the form of foreign aid from developed to the developing world due to capital scarcity faced by these developing economies (Durbarry, 1998).

## ii  Foreign Exchange Earning-Expenditure Gap Approach

This foreign exchange earnings-expenditure gap approach concentrates on the importance of foreign aid as it supports to fill the foreign exchange reserves in an economy. The foreign exchange reserves of an economy determine its financial capacity to participate in the international trade. Adding to this, foreign exchange reserves also helps to buy advanced production techniques, managerial skills, research ideas that will help to reduce the cost of production. By considering the importance of foreign exchange reserves for a developing economy, this approach concentrates on the import capacity as the main constraint on domestic investment and growth. If the rate of change is experienced by export sector happens to be greater than the rate of change taking place of the import sector then the given economy will become increasingly self-reliant. The foreign aid requirements in the initial year ($F_0$) to fill the foreign exchange gap will be:

$$F_0 = M_0 - K_0 \qquad\qquad (2.9)$$
$$\text{Or, } F_0 = Y_0 m_a - Y_0 x_a$$
$$(2.10)$$

Or, $F_0 = Y_0(m_a - x_a)$

(2.11)

Where $Y_0$ signifies the national output in the initial year, $m_a$ and $x_a$ reflects average import ratio and average export ratio respectively during the initial year. Foreign aid requirement in the next year ($F_1$) will be:

$F_1 = (Y_0 m_a + Y_0 \text{ m'r}) - (Y_0 x_a + Y_0 \text{ x'r})$

Or $F_1 = (Y_0 m_a - Y_0 x_a) + (Y_0 \text{ m'r} - Y_0 \text{ x'r})$

Or $F_1 = Y_0 (m_a - x_a) + Y_0 \text{ (m'r- x'r)}$

Or $F_1 = F_0 + Y_0 \text{ r (m'-x')}$ Note: $F_0 = Y_0 \text{ (ma} - x_a)$

Where m' and x' stands for marginal import ratio and marginal export ratio respectively and r is the target rate of growth. Thus, foreign aid requirements to decline in the succeeding year, depends upon its own lags, x' must be greater than m' (i.e. x'>m'). However, the saving-investment gap and foreign exchange gap approaches to the determination of capital import requirements for achieving a target rate of growth are identical.

F = E-Y = I-S = M-X

Where F indicates net capital import; E signifies aggregate domestic expenditure; Y is national output; I reflect domestic investment; S shows domestic savings; M represents imports and X is exports. Thus, the net capital import or foreign aid requirements are equal to both gap between imports and exports, and that between domestic investment expenditure and domestic saving (Phull, 2007).

### iii  The Fiscal Gap

Recently, fiscal constraint has been considered as a factor that adversely affects the growth prospects of the highly indebted group of developing economies. Increase in the external debt burden in the recipient economies creates difficulties on the part of the government via budget deficit. This budget deficit may cause either foreign exchange constraints or overall savings restrictions in the recipient economy. The fiscal constrained of investment (IT) can be expressed as:

IT = (I+K*) [f (p,h) + (T-G) +(F-J)]

Where, K* is the value of government investment; p is rate of inflation; h is the propensity to hoard; T is the government gross income; G is government consumption, i.e T-G is the primary budget surplus in current account; F is the net capital inflows; J is the net factor services to abroad, F-J is net foreign transfer to the recipient government (Bachha, 1990). This approach states that foreign capital in the form of foreign aid plays a significant role in supplementing the fiscal deficit of the recipient economy caused due to lower rate of domestic saving, high inflation or higher rate of public consumption over income.

## 2.1.1 Theories of Foreign Aid

Economic theories related to foreign aid are classified into two broad categories. First categories of economic theories are known as domestic or supplemental economic theories. They focus on the positive impact of foreign aid program in which aid supplement domestic resources of the recipient economy. Foreign aid financially supports the developmental activities of the aid recipient economies via supplementing its scarce domestic resources which is essential to achieve higher rate of economic growth. The supporters of this foreign aid programs are more optimistic relating to the contribution of foreign aid towards development process. Supporting this view, the opportunities created by the inflows of foreign aid program compel the recipient government to increase their own development efforts. These economic theories can thus, in general, be characterized as supporting the positive impact of foreign aid program on economic growth. However, the second category of economic theories known as external or displacement economic theories, that focus on the negative impact of foreign aid program on the recipient economy. They consider foreign aid as a substitute for the domestic resources of the recipient economies. Higher amount of foreign aid inflows in the concessional rate leads to shift in the developmental expenditure to non-developmental expenditure. This unproductive utilization of the foreign aid program, for instance, through imports of inappropriate foreign technology leading to the claim that aid reduces the efficiency of developmental expenditure as well as its volume. This unproductive expenditure cause negative relationship between aid and the amount of domestic resources devoted to developmental expenditure. Over all, we can say that domestic or supplemental economic theories support the positive impact of foreign aid program

whereas external or displacement economic theories support negative impact of foreign aid program.

Similarly, political theories can also be classified under two broad categories. The first category of these political theories considers foreign aid as an instrument of domestic policy whereas the second category considers foreign aid as an instrument of foreign policy. The first category gives more emphasis on the recipient government as aid-users and is concerned more with the benefits of the recipient government with respect to competing groups within the national polity. The second category of the political theories focuses more on the donor motives as aid-users and more concerned with the interests of the donor country in relation to the recipient countries. Overall, the first category of the political theories on foreign aid are more recipient oriented theories whereas, the second category are more concern about the donor motives (White, 1974).

Out of these four categories of foreign aid theories, the first category of economic theories dominate most of the foreign aid literature and believed that foreign aid act as a catalyst for higher economic growth in the recipient economy. Each category of foreign aid theories has its own peculiar characteristics. Still there are number of common features found in all of them. The common factors include, attainment of self-sustaining growth is one of the major objective of foreign aid program; providing an analytical framework for determining how much aid a developing country will require; to evaluate the impact of foreign aid on economic growth: recommending policy implication to achieve a targeted rate of growth and to enhance the aid effectiveness. After discussing the major theoretical approaches of foreign aid program, now we will discuss very briefly different economic growth models and development theories with relation to the importance of foreign aid program towards higher economic growth of the aid recipient economies. The main development theories and growth models are as follows:

## 2.1.2. Harrod-Domar Model

Harrod and Domar model of economic growth considers higher rate of capital accumulation is the key determinant of higher economic growth. This model has explained the rate at which investment and income should increase so that it will help

to attend a steady state of economic growth by utilizing all the resources. This model is an improvement over the classical economist (gave priorities on the productive aspects and ignored the income aspect such as, demand) and Keynesian approach (gave importance to income generation and neglected productive capacity aspect), as it has considered both aspects such as, productive aspect and income generation aspects. Both economists emphasized on the dual role of investment. On one hand new investment generates income (through multiplier effect) and on the other hand, it increases productive capacity of the economy (through productivity effect) by expanding capital stock. But inadequate amount of domestic saving creates a problem in attainment of steady state of growth rate in most of the developing economies.

To support their inadequate amount of domestic saving, most of the developing economies rely on foreign aid to supplement their scarce domestic resources and to finance their developmental programs; it will help them to attend a steady rate of economic growth in the long run.

### 2.1.3 Solow Model

Solow growth model is an extended version of the Harrod-Domar growth model. This model has added another important factor such as, labor and introducing a third independent variable technology to the growth equation. Solow growth model is based on the assumption that there is diminishing return to scale operate if we consider the factors of production such as, labor and capital separately, but both factors jointly contribute constant returns. Third factor such as, technological progress considered as the independent factor (as it determined exogenously), because of it Solow neo-classical growth model is also known as "exogenous" growth model. Solow classified the economy into two broad sectors, capital or industrial sector and labor or agricultural sector. In industrial sector, the rate of capital accumulation exceeds the rate of labor absorption. But, in a developing economy, agricultural sector is characterized by the existence of disguised unemployment and shortage of skilled labor which adversely affects the productivity and wage rate of the agricultural laborer. This underutilization of existing resources creates hurdle in the path of attainment of higher economic growth. In this context, the steady growth is possible if we raise the capital-labor ratio in the economy. But shortage of capital is a common feature of most of the developing economies, so they have to depend upon foreign aid

to supplement their scarce resources. In this context, foreign aid contributes towards the growth process of these developing economies through supporting the scarce domestic resources.

## 2.1.4 Big Push Theory

The theory of 'big push' is propounded by Professor Paul N. Rosenstein-Rodan. The idea behind the theory is that a big comprehensive investment package or a big push is required to overcome the obstacles of economic development in a developing economy. Further, this high amount of investment package will help to accelerate the development process of that economy. It can be defined as a certain amount of capital must be devoted for the developmental activities in an economy with the aim to attend a targeted rate of growth in the long run. It believed that bit by bit allocation of investment funds will not help an economy to move on the path of higher economic development, rather a specific amount of investment is required to overcome from the state of underdevelopment and to move on the path of development. For this, a huge amount of investment funds are required. But for a developing economy, it is really very difficult to arrange such huge amount of capital to invest. In this context, foreign aid facilitates the capital deficit problems of these developing economies via providing adequate amount of foreign exchange reserves at a concessional rate.

## 2.1.5 Endogenous Growth Models

This endogenous growth models have been developed by Arrow, Lucas and Romer. Endogenous growth model states that economic growth process is determined by the endogenous factors, generated within the economic system. This theory was developed as a reaction to the limitation of the Solow-Swan neoclassical growth model. This model explains that endogenous factors contribute the long run growth rate of an economy rather than the exogenous factors as explained in the neoclassical growth models. This endogenous growth model extended the neoclassical growth models by introducing one endogenous factor such as technological progress in the growth model. This model emphasizes on technical progress depend upon the rate of investment, size of capital stock and the human capital. The endogenous growth theory examines production functions that show increasing returns because of specialization and investment in knowledge capital. Adequate amount of investment

funds required to invest in human capital, research activities and innovations. In case of developing economies, it is really difficult to arrange the funds to invest in these above sectors. Their domestic capital can only partially fulfill their investment needs. To support their domestic capital, they rely on foreign aid as it brings foreign assistance at a lower interest rate, technical knowledge, managerial skills, and research ideas (Morrisey, 2001).

## 2.1.6 Balanced Growth Theory

The doctrine of balanced growth has been developed by Rosenstein Rodan, Ragnar Nurkse and Arthur Lewis. This growth doctrine states that there should be simultaneous and harmonious development of different sectors of the economy, so that all the sectors grow in a uniform manner. Therefore balance growth requires a balance between different sectors of the economy during the process of economic growth. There should be proper balance between agriculture and industry and between the domestic and foreign sectors. Further, it requires balance between social and economic overhead capitals and, between vertical and horizontal economies. Balance is also required between the demand and supply sides. The demand side gives emphasis on those programs associated with larger employment opportunities along with higher income as it increase the demand for goods and services in an economy. The supply side gives emphasis on the simultaneous development of all the inter-linked sectors such as, intermediate goods, raw materials, power, irrigation, agriculture, transport which help in increasing the supply of goods. To make balance among all the sectors of an economy, huge amount of investment funds are required which is very difficult for all developing economies. Professor Singer criticized this balanced growth doctrine as a premature growth theory and it is only applicable to the subsequent stage of economic growth.

## 2.1.7 Unbalanced Growth Theory

The doctrine of unbalanced growth has been propounded by Albert Hirschman. This theory is developed as a reaction to the balanced growth doctrine. Economists like Singer, Kindleberger and Straitens are also supporting the unbalanced growth

doctrine. This doctrine states that investment should be made in selected sectors of an economy rather than simultaneously in all the sectors of an economy. No underdeveloped or developing economy possesses capital and other resources in such a huge amount that can be invested simultaneously in all the sectors of their economy. Therefore, investment should be made in selected sectors or industries for their rapid development, and the economies experienced from them can be utilized for the development of other sectors. In this manner, the economy will gradually moves from the path of unbalanced growth top that balanced growth. To invest in the selected sectors, developing economies required adequate amount of capital. If their domestic capital becomes inadequate to finance, then they rely on foreign aid to invest in these selected sectors.

## 2.2 Empirical Review

There is a large amount of research done on aid-economic growth relationship both at country specific and cross-country levels. However, empirical studies reviewed in this section are chosen due to their relevance to this study. Particularly, most studies reviewed are done in developing countries; hence they could bring out proxies of variables and methodologies that are vital to this study.

### 2.2.1  International Context

 Gong and Zou (2001) suggested that an increase in the amount of foreign aid a country receives reduces capital accumulation and labor supply and increases consumption in the long-run. Using an optimal growth model with foreign aid, foreign borrowing, and endogenous-leisure-and-consumption choices, they find that an increase in aid raises income. An income increase causes consumption to increase and investment to decrease. This is a channel through which aid negatively affects the growth process through dissipation of increase income in consumption.

Easterly (2003) focused on the financing gap because foreign aid is believed to increase investment which in turn increases economic growth. When testing 88 aid recipient countries for the years 1965 to 1995, he finds that only six countries had increases in investment and four countries had a positive relationship between growth and investment. In sum, the relationship between aid and growth is unclear.

Rajan and Subramanian (2005) suggested that aid has detrimental long-term effects on economic growth of developing countries through a decrease in employment. In a study of 40 countries for the period 1980-1989 and 28 countries for 1990-1999, they examine whether labor-intensive industries have a relatively slower growth rate in countries with high aid inflows by controlling for within-country effects. Controlling for differentials in industries within countries, they assume that aid giving is driven by trade and exchange rate policies. They find that aid inflows undermine the competitiveness of a country's exporting sectors because aid causes an overvalued exchange rate that has adverse consequences on the growth of traded goods sector in the recipient country. Reduced competitiveness in the traded good sector decreases employment growth. Decrease in employment growth can trigger the country's future dependency on aid. As a result, there will be an increase in the level of aid that the country receives.

Ekanayake and Chatrna (2007) tested the hypothesis that foreign aid can promote growth in developing countries using panel data series for foreign aid, while accounting for regional differences in Asian, African, Latin American and Caribbean countries and differences in income levels (low income, low-middle income, upper-middle income and all income levels). They derive their model from a production function in which foreign aid is introduced as an input along with labor and domestic capital. Using data on a group of 83 developing countries for the period 1980 to 2007, they find that foreign aid has mixed effects on economic growth in developing countries. Specifically, foreign aid was found to have a positive effect on economic growth only in African countries. When the different income groups were considered, the foreign aid variable had a negative sign for low-middle income countries and a positive sign for the other three.

Kabete (2008) examined the impact of foreign aid on economic growth in Tanzania. It was interested in the analysis of this relationship because the country receives a considerable amount of foreign aid but still experiences very low economic growth and high poverty levels. The period under study is from 1990 to 2004 and used data from the World Bank, World Development Indicators 2006 and the former Ministry of Planning, Economy and Empowerment (Tanzania). The analysis of the contribution of foreign aid to economic growth has combined other variables which are net

national savings, export growth (annual percentage growth), and total debt service. Except the export growth, other variables were measured as percent of Tanzania's Gross National Income (GNI) for the period under study.

Furthermore, aid was disaggregated in terms of government's development or recurrent expenditures and their impact on GDP growth was analyzed. The main findings are that foreign aid and total debt service have a negative impact on GDP growth for the case of Tanzania. On the other hand, export growth and net national savings have shown a positive impact on GDP growth as it was expected because they increase the country's capacity to invest. Both government's development and recurrent expenditures of foreign aid resources have shown a negative impact on GDP growth. This implies that the development expenditures undertaken were not enough or not productive enough to impact on GDP growth positively. The overall aid and aid for development expenditures have shown to have more negative impact in the 1990s than in the early 2000s.

Hossain (2014) estimated 33 years data on foreign aid for 1980-2012 periods and analyzes the effects of foreign aid on the economic growth of Bangladesh. To examine the effects of aid more precisely, this study estimates eight separate models including three for the last three decades (1980-1990, 1991- 2001, 2002-2012), four for the four different government period namely, Military government (1982-1990), BNP (Bangladesh Nationalist Party) government (1991- 1995, 2002-2006) , BAL (Bangladesh Awami League) government (1996-2001, 2009- 2012) and the Whole Democratic government period (1991-2012) and one for the entire period (1980-2012). This research finds that, foreign aid has positive effect on the economic growth of Bangladesh and it is statistically significant in two models out of eight models. This paper also reveals that the aid generates decreasing returns in Bangladesh because of capacity constraint of Bangladeshi institutions to utilize the foreign aid effectively.

Jeffrey (2015) by employing OLS estimation found that bilateral and multilateral aid yields mixed and interesting results. For middle and low income countries, a 1 percentage point increase in inflation on average causes the effect of bilateral aid on growth decrease by 1.516 percentage points and increases the effect of bilateral aid on growth by 2.162 percentage points on average. Further he stated that for multilateral

aid, the signs for these two interaction terms (Inflation and Polity scores) are opposite to what they are for the bilateral interaction terms.

Multilateral aid interacted with inflation yields a positive value, meaning that as inflation increases one percentage point, multilateral aid's effect on growth increases 2.217 percentage points, polity 2 (measure of a country's political regime) scores interacted with multilateral aid are negative, meaning a point increase in a country's polity 2 score results in a decline of 4.557 percentage points.

Galiani, Knack, Xu and Zou (2016) using the sample of 35 countries that crossed the IDA threshold form below between 1987 and 2010, found that a 1 percent increase in the aid to GNI ratio raises the annual real per capita short term GDP growth rate by 0.031 percentage point . The mean aid-to-GNI ratio at the crossing is 0.09, so a one percentage point increase in the aid-to-GNI ratio raises annual real per capita GDP growth by approximately 0.35 percentage points. They further said that increasing the aid to GNI ratio by one percentage point, increases the investment to GDP ratio by 0.54 percentage points, although this coefficient is generally not significant. The magnitude of the effects on growth and investments consistent with the average capital stock to GDP ratio for the sample countries.

### 2.2.2 Nepalese Context

Poudyal (1982) found positive association between foreign aid and saving by using correlation and regression analysis. The study was based on the secondary data. The main findings of the study were (a) foreign aid was being concentrated on infrastructure and neglected other sectors, (b) positive effect of foreign aid was more on saving than on consumption, (c) the GDP, domestic saving and consumption were highly stable function of foreign aid, (d) elasticity between GDP and domestic saving was higher than that of between GDP and foreign aid.

Further he concluded that if aid was utilized in road construction, maximum benefits from roads can be obtained only if in areas opened up by roads complementary development programs were lunched simultaneously like agriculture and industry etc. The study showed that there was positive association between foreign aid and saving. Foreign aid was contributing to increase national efficiency through positive effect on

income, saving and consumption. The level of GDP was also positively related to the inflow of foreign aid.

Poudyal (1988) performed regression analysis by using data from 1964 to 1982, between foreign aid and economic growth and aid and domestic saving. He found that foreign aid had a significant positive effect on the level of GDP. The result showed a reasonably well overall fit the model. He has concluded that foreign aid in Nepal positively contributed to the country's GDP growth but substituted domestic saving. He also estimated the model using five years lag of aid. For that one and two years lag, the coefficients were found smaller and negative. But for the four and five year lag, the coefficients were positive and larger. Thus, he claimed that the long running aid funded projects did not contribute to the economy in short run. The negative short run relationship between aid and growth was attributed to the use of domestic resources to support these long run running foreign financed projects.

However, its descriptive data analysis showed that there was more than 50 percent contribution of foreign aid to financing the development plans. The existed gap between foreign aid commitment and disbursement and aid utilization capacity of Nepalese economy was the main problem. His data analysis also found noticeable shifts of foreign aid from transport and industry towards agriculture, power and social services.

Khadka (1991) stated that Nepal relied heavily on foreign aid and donors coordinate development policy through the Nepal development forum; whose members include donor countries, international financial institutions and international governmental organizations. Its reliance on aid increased 45 percent development expenditure in 1975 to about 56 percent in 1986 and aid GDP ratio increased from 2.6 percent to 6.9 percent during the same period.

According to this study, aid had not been effective in alleviation poverty in Nepal. On the contrary aid had created dualisms between urban and rural areas in terms of consumption, and it further widened gaps between haves and haves not and social disparities was still growing. Aid neither helped to attain the goals nor to establish institutional political machineries. Hence aid failed to alleviate poverty of the country because it was unable to grasp the majority of population who live in rural areas. He

stated that the economic condition had not improved in Nepal despite the priority of aid because an increase in the basic needs to the poor and rural development. Further, he stated that aid contributed to creation of physical capacity but this failed to create the necessary condition for breaking the barriers of development. It is stated that as a matter of fact declined in real terms by the 1970s and aid endorsed by international organizations and bodies remained unfulfilled. Finally he added that learning from crisis was better than becoming chronically dependent on aid.

Acharya (1998) concluded that although foreign aid did not substantially contribute to the economic development of Nepal, the importance of foreign aid cannot be denied, because the domestic resources mobilization of Nepal is still very low to fulfill her basic requirement. In this respect new visions and new ways of aid utilization have to be launched from both donors and recipients to use these aids in the related or concerned sectors optimally not considering aid as free gifts.

Bhattarai (2007) by employing co-integration test found that per capita development expenditure was positively associated with both per capita aid and per capita GDP in the long run. The long run aid coefficient was significant at the 5 percent level, but the elasticity of per capita development expenditure with respect to per capita aid is quite low (0.11). Further he stated that the elasticity of per capita non-development expenditure with respect to per capita aid is found to be relatively larger (0.61) than that for development expenditure. In other words, one percent increase in per capita aid led to approximately 0.6 percent increase in the per capita non-development expenditure, whereas it led to only a 0.11 percent increase in per capita development expenditure.

Karna (2007) stated that foreign aid holds critical importance in Nepal. Even though its economic importance lies in the fact that it provides resources not only for the national budget; rather it also helps bridge the gap between national saving and investment. It also helps to meet the gap between excess of import and exports of goods and services. The very critical issue about foreign aid is that it should be used properly at appropriate place. Nepal has been receiving foreign aid since early 1951 which seeks to meet the resource for annual budget, to help and provide resource for various periodic plans, to accelerate the pace of economic development in proper way, to utilize the untapped natural resources, to meet the millennium development goals,

to escape from vicious circle of poverty, to modernize agriculture, to industrialize and for the proper and balanced sector wise development.

He further argued the fact that, the need to fill saving investment and export import gap aid is important source of development finance in the capital poor economies. It has helped considerably to finance the growing import needs required by the development process. The technical assistance has helped to bridge the technology gap constraining the planning and execution of development projects. It has significantly contributed in removing transport and communication bottlenecks, industrial viciousness and agricultural backwardness. To become specific almost all the highways and communication networks, most public industrial enterprises, agricultural and rural development projects and development projects and development institutions are undertaking foreign aid.

From the recipient point of view, the broad goal of seeking aid in Nepal is to promote economic development. He shows 49.9 percent foreign aid as development expenditure from first to ninth periodic plan, yet some of the sectors remain untouched by these assistances. This is due to miscalculation of actual problems. Despite of some critical lines, he establishes foreign aid as the crux of Nepalese economy and spender in its development efforts.

Pyakuryal, Adhikari and Dhakal (2008) found that the domestic saving and investment gap as the percent of GDP at producers' price averaged around 8 percent during the period of FY 1994/95 till 2003/04, whereas it has leveled around 11 percent during FY 2002/03. However, during FY 2004/05 the preliminary estimates shows the gross domestic savings at 14.4 percent and total investment at 28.9 percent revealing the gap of 14.5 percent of the GDP.

Gross domestic saving as percent of the GDP declined from a level of 16.2 percent in FY 1997/98 to 15.2 percent during FY 2003/04 whereas total investment during the same period grew from 24.8 percent of GDP to 26.4 percent. The resource gap has thus widened over the years due to increasing fiscal deficit. The fiscal deficit of NRs. 15.83 billion in 2003/04 increased by 14 percent and escalated to NRs. 18.05 in FY 2004/05 indicating the widening gap between government expenditure and revenue.

Sigdel (2010) by adopting non-linear regression model found that there is a significant relationship between resource gap and foreign aid. He found that one billion increments in resource gap is met by more than one billion increment in foreign aid during the period of FY 1981/82 to 2001/02. The flow of foreign aid is found to be faster than the increment in resource gap (1.023477, lag coefficient).

The role of foreign aid to bridge the resource gap in Nepal has been crucial, which is estimated to be more than 60 percent of total resource gap. The remaining part is met by remittances and foreign currencies earn by tourism sector. The magnitude of remittances including unrecorded flows increased to $ 820 million, which is nearly 14 percent of GDP in FY 2003 from about $ 750 million in FY 2002 and exceeded the size of exports equal to $ 642.8 million.He further states that foreign aid to Nepal commenced in  FY 1950/51 with NRs. 1.01 million worth. Up to 1970, foreign aid flow to Nepal confined to diminutive size. During the period 1950-70 bilateral grants played a predominant role in the structure of foreign aid in Nepal. Foreign aid to Nepal increased substantially in each succeeding decade, which leveled NRs. 186,334.9 million in  FY 2000/01, of which, grants went up to NRs. 63680.5 million and the loan equal to NRs. 122,636.3 million. The ratio of ODA to GDP was 3.8 percent in Nepal during the period of 1970s and 7.8 percent in 1980/81is much higher in comparison of other south Asian countries such as Bangladesh, Sri-Lanka and Pakistan. Over the long span of last five decades, magnitude of foreign aid to Nepal is 57.5 percent of total development expenditure. During the first plan (1956-1961), Nepal's development expenditure (NRs. 382.9 million) was fully funded by foreign aid. In subsequent plan periods from the second to the ninth plan (1962-2002) the extent of foreign aid was as high as 52 percent of development expenditure in Nepal. This is indicative of Nepal's heavily depends on foreign aid, which ballooned to the level of NRs. 2,151,454.4 million during the Ninth Plan (1997-2002) from a diminutive sum of NRs. 382.9 million in the first plan. In tenth plan Nepal received NRs. 134,620 million worth foreign aid which is 57.5 percent of development expenditure. In addition, he concluded that foreign aid has become a foundation of North-South relation.

Acharya and Koirala (2011) stated That foreign aid has been unable to achieve its major objectives in Nepal by principle. Foreign aid helps to bridge the resource gap in

short term so that in long-term, the developing countries would be able to mobilize its own resources for sustainable development. But in reality, Nepal could never mobilize its internal resources to meet the financial requirements of its developing activities. Similarly foreign aid was started in the country in 1950s with the first and foremost objectives of economic and political stability. But, despite a regular inflow of dollars for more than half a century, the Maoist insurgency began and Nepal has now become the most unstable it has ever been politically as well as economically. The impact of foreign aid in Nepal is having paradoxical results.

They further raised the issue donor's investment in education. Benefitting recipient or donors themselves and said that, in principle education does not only increase the productivity of economy but also helps in invention and innovation. But our excellent education productions are working for the developed countries.

The country is getting zero from such a huge investment in education while the donor countries investing less than 30 percent of total education budget of Nepal are being to get cream product of the education system. This bitter truth raises the question that the donor countries are investing in the education sector of poor countries for the recipient of donor's themselves benefits.

Basnet (2013) examined that effectiveness of foreign aid on growth and domestic saving using a simultaneous equation system. He found that foreign aid has a positive and significant impact on growth in five south Asian countries. The result reveals a negative relationship between foreign aid and domestic savings and there is no ambiguity that foreign aid adversely affects domestic savings in south Asian countries during the period of 1980-2008. His result brings up a very important policy issue that is the positive effects of aid on growth might be offset by the negative effect on domestic saving.

Furthermore by using SLS estimation be found the impact of aid on growth is positive and satisfactory significant at the 1 percent level. The result indicates that saving have a satisfactory significant impact on the growth rate of the five countries (Bangladesh, India, Nepal, Pakistan, and Sri-Lanka). He found that saving affects growth rate more than proportionately that is a 1 percent increase in domestic saving rate causes growth to increase by more than 1 percent on average. i.e. 1.5 percent. The growth rate of

export and import, however, has a negative association with the rate of economic growth.

Dhungel (2015) discussed the role of foreign aid in case of Nepalese economy. The newspaper article explained that in 1970s the amount of foreign aid was 1.7 US billion and it reached to 17.9 US billion in 1980. Further, foreign aid climbed to 68.5 US billion and 181.2 US billion in 1990s and 2000s respectively. The article claimed that foreign aid has influential impacts both on economic growth and development in Nepal.

Karkee and Comfort (2016) discussed the role of foreign aid in the development of Nepalese economy. The paper explained that inflow of foreign aid was continuously increasing in Nepal and it was channeled to development activities. Even though it was utilized in development activities, the economy was underdeveloped. The reason behind of being under developed was explained due to lack of aid rather than aid efficiency. The paper concluded that there is need of more aid for growth and development.

# CHAPTER III

# RESEARCH METHODOLOG

## 3.1 Research Design

The study used both descriptive as well as analytical tool to analyzed stated variables. Mean, median mode, quartile kurtosis, skewed are used for descriptive analyze the variables. Similarly, analytical tools are used for study of the variables.  The econometric procedure to answer these questions required testing for stationary through unit root tests. Then OLS equation is estimated along with other core determinant. Residual tests such as normality, serial correlation and heteroskeda sticity are made. Finally, the cumulative sum of squares test is conducted to check the stability of the equation. The study is descriptive and analytical in approach. So, it utilizes quantitative approach. The research is completely based on time series secondary data.

## 3.2  Period of the Study

The study uses annual data on different variables from FY 1990/91 to FY 2015/2016 comprising 23 observations of each.

## 3.3 Nature and Sources of Data

The nature of the study is descriptive as well as analytical. The study is primarily based on the secondary sources of data. In reviewing the theoretical and empirical concepts on economic growth. The study uses various journals, working papers, study reports, case studies, peer reviewed articles, books, among others, published by various national and international institutions and scholars along with unpublished thesis and dissertations.

Quarterly Economic Bulletin (NRB), Banking and Financial Statistics (NRB), Government Finance Statistics (NRB), Economic Survey Reports (MOF,GON), National Accounts of Nepal (CBS), Statistical Year Book of Nepal (CBS), Statistical Pocket Book (CBS), International Monetary Fund and the World Bank Data Bank are the major sources of data and information for the study.

## 3.4 Model Specification

Study consists four variables nominal GDP, bilateral aid and multilateral aid and total aid. Model is formulated assuming that nominal GDP is dependent variable and bilateral and multilateral aid as independent variables. All variables are converted into natural log.

$$\ln GDP_t = \beta_0 + \beta_1 \ln BA_t + \beta_2 \ln MA_t + U_t$$

Where,

$\ln GDP$ = natural log Nominal Gross Domestic Product

$\ln BA_t$ = natural log bilateral aid

$\ln MA_t$ = natural log multilateral aid

$U_t$ = error terms.

$\beta_0$, $\beta_1$,$\beta_3$ are parameters.

## 3.5 Data Analysis Techniques

All variables of each model are converted into natural logarithms to facilitate the calculation of elasticity and to make it possible the transformation of the non-linear models into log linear one.Basic structures of the transformed variables regarding its central location (mean); spread (standard deviation), and shape (skewness and kurtosis), variability and normality (Jarque-Bera) are calculated and presented as a summary statistics.

## 3.6  Time Series Analysis

One of the important types of data used in empirical analysis is time series data. Researcher takes such data in practice because they cause several challenges to econometricians and practitioners. Generally, empirical works based on time series data assume that the underlying time series is stationary. Therefore, it is important to determine the characteristics of the individual series before conducting empirical analysis. This is important because in the absence of non-stationary of time series variables, the normal properties of t-statistics and measures such as R-squared break results, hence a problem. The econometric methodology applied therefore begins by examining the rank of integration for the series of the dependent and explanatory variable in their natural log format using the Augmented Dickey-Fuller test. The regression equation for the ADF test of unit root can be written as follows:

$$\Delta Y_t = \alpha + \beta \ \ + \sum \delta \ \ \Delta Y_{t-1} + \mu_t \quad (3.4)$$

Where, the t symbol denotes time trend, Y is the variable in estimation procedure, μ represent the distributed random error term with zero mean and constant variance. Assuming that $\mu_t$ is serially uncorrelated and using the AR (ρ) process, the hypothesis for the ADF test is specified as follows:

$H_O$ : δ = 1 is the Null Hypothesis implying unit root, and

$H_1$ : δ< 1 is the Alternative Hypothesis implying stationary

This study considers Augmented Dickey-Fuller (ADF) unit root tests to all individual empirical variables of the model. Non-stationary individual series are then transformed to stationary through difference stationary process.

## 3.7 Serial Correlation

One of the important assumption of OLS is there is no autocorrelation among the error terms. i.e. COV $(u_i, u_J) = 0$. Where $u_i$ and $u_j$ are error terms. If this assumption is violated or if error terms are correlated each other's then it is termed as autocorrelation i.e. COV $(u_i, u_J) \neq 0$. It is also termed as serial correlation.

The most common type of autocorrelation is first-order autocorrelation, and it is usually present when an observed error tends to be influenced by the observed error that immediately proceeds in the previous time period. The existence of autocorrelation in the residuals indicates that the assumption $E(\varepsilon_i \ \varepsilon_j) = 0$ has been violated. It is important to be sure that there is no autocorrelation in the residuals because otherwise the standard errors are invalid.

**Consequences of Autocorrelation:** The value of parameter are linear, unbiased but variance of parameters are inefficient.

**Detections of Autocorrelation**

Durbin-Watson (DW-test) and Breusch-Godfrey Serial Correlation LM test are applied to detect the problem and order of serial correlation in the error terms.

**Durbin Watson (DW) Test**

One of the important assumption of Ordinary Least Square Method is there is no autocorrelation among the error terms. Violation of this assumption is called auto-correlation or Serial correlation. Hence, DW test is used to check or detect whether there exists the autocorrelation among the error terms.

DW test is given as:

DW $= \sum (e_t - e_{t-1})^2 / \sum e_t^2$

When value of DW test is near to zero then there is positive autocorrelation.

When value of DW test is near to 4 then there is negative autocorrelation.

When value of DW test is near to 2 then there is no autocorrelation.

Where,

e = estimated error t

## 3.8 Heteroscedasticity

The existence of heteroscedasticity in the errors implies that the assumption of constant variance in the errors is violated i.e. $V(\varepsilon_t) \neq \sigma^2$. If this is the case, heteroscedasticity in the errors do not affect the un-biasness of the OLS estimates but it affects their precision. The standard errors become biased and the tests of statistical significance cannot be valid. Breusch-Pagan/Godfrey Lagrange Multiplier test of error term is conducted to detect the problem of heteroscedasticity and weighted least squares technique is used to minimize it.

$H_0$:Hetroskedasticity or variance of error are not constant.

$H_1$:Homoskedasticity or variance of error are constant.

If p value of Breush-Pagan Godfrey LM is more than five percent then variance of error terms are constant i.e.  Homoscedasticity.

If p value of Breush-Pagan Godfrey LM is less  than five percent then variance of error terms are not constant i.e. heteriskedasticity.

## 3.9 Normal Distribution

It is also important to check that the residuals are normally distributed; this is done with the Jarque-Bera (J-B) statistic. This statistic tests whether there is a significant difference of skewness and kurtosis of the residuals from the normally distributed residuals. The null hypothesis is that the residuals are normally distributed. The J-B has a Chi-square distribution and if it is rejected the residuals are said to be normal. Two components of this statistic are Skewness and Kurtosis. Skewness measures the symmetry of a normal distribution and its expected value is zero. Regarding Kurtosis, this is an indicator that measures how peaked and flat the distribution is, a normal distribution is expected to have kurtosis equal to 3.

$H_0$: Error terms are not normally distributed.

$H_1$: Error terms are normally distributed.

If p value of JB statistics more than five percent then error terms are normally distributed.

If p value of JB statistics less than five percent then error terms are not normally distributed.

## 3.10 $R^2$ and Adjusted $R^2$ Estimation

The degree of relationship existing between dependent and independent variables is shown by the coefficient of determination ($R^2$). Hence, in each case, the coefficient of determination ($R^2$) has been calculated in order to test the explanatory power of independent variables.

After estimating the regression parameters, $R^2$ is used for judging the explanatory power, which measures the dispersion of observations to the line, the better explanatory of the variations of Y (dependent variable) by the change in the explanatory variables. Thus, in overall, $R^2$ has been computed to show the percentage of the total variation of the dependent variable that is explained by the independent variables. The formula to derive $R^2$ and adjusted $R^2$ are mentioned below.

$R^2 = 1 - \frac{\Sigma e^2}{\Sigma y^2}$

Where $y = Y - \bar{Y}$

Similarly, Adjusted $R^2$ can be calculated by using following formula given as:

$R^2 \text{ bar} = 1 - \frac{\Sigma e^2 / (n-K)}{\Sigma y^2 / (n-1)}$

$R^2 \equiv 1$, refer to higher degree of goodness of fit estimated regression model

$R^2 \equiv 0$, refer to low degree of goodness of fit or poor fit estimated regression model

Where,

n = Total number of observation.

K = Number of parameter.

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### 3.11 T- Test

The small sample test, t- test, will be performed in order to identify the statistical significance of an observed sample regression coefficient and the formula for calculating the values is:

$$t = \frac{\beta}{SE(\beta)}$$

Where,

$SE(\beta)$ = Standard Error of $\beta$

Higher value of t test indicates that there is significant relationship between estimated coefficient and population parameters. Similarly, low value of t test is not significant which means there is no significant relationship between estimated coefficient and population parameter.

### 3.12 F – Test

F -Test is used to measure the overall significant of the estimated regression, which is also a test significance of $R^2$ because these two vary directly. When $R^{2} = 0$, F is zero and when $R^2 = 1$, F is infinite. That is to say, higher the value of $R^{2,}$ the greater the value of F test. Thus, larger value of F test implies that overall significant of estimated regression model. The value of F test can be computed by using following formula as:

$$F = \frac{R^2/(K-1)}{(1-R^2)/n-k}$$

Where,

K = Total Number of Parameters to Estimated.

n = number of observation.

$R^2$ = Coefficient of determination.

### 3.13 Standard Error of Regression Line

The standard error of regression line (estimate) is a measure of precision in the reduction of value of dependent variable base the regression equation give the value of dependent variable.

The standard error of the regression line is used to measure the dispersion about an average line called regression line.

For the regression equation Y on X i.e. Y = a + b X, the standard error of the regression equation is given by:

$$S_{xy} = \sqrt{\frac{\sum Y^2 - a \sum Y - b \sum XY}{n-2}}$$

**CHAPTER IV**

**DATA PRESENTATION AND ANALYSIS**

First, this chapter explains about the growth performance and foreign aid situation in Nepalese economy employing a descriptive approach between the periods 1991 to 2016. Then, growth rates time trend of real GDP and foreign aid components are presented in line graph. Second, it presents the results of the empirical research for all purposed models in the methodology chapter. It discusses the main empirical findings of this research by analyzing the estimated and computed results. The chapter also presents the results of all diagnostic tests carried out in this study and describes the outcome of the test results.

**4.1 Gross Bilateral Aid**

Joining to the Colombo Plan in 1952 was another pioneering effort for the growth of foreign aid through bilateral sources in Nepal. During the 1950s Nepalese students received scholarships through the Colombo Plan to go to different countries for studies in technical and professional areas. Nepal got considerable amount of aid for various projects from the Russia, China, the UK, and France, etc. after joining the Colombo Plan.

Nepal receives foreign aid from two sources- bilateral and multilateral having both grants and loan. The annual average growth rates of Gross Bilateral Aid is Rs. 24893.1 million. Bilateral aid is Rs. 2939.9 million in 1991 and Rs. 91069 in 2016. The maximum bilateral aid is Rs. 178369 in 2015 and minimum bilateral aid is Rs. 2627.1 during the study period. The growth rate of bilateral aid is ups and down during the study period. The average growth rate of bilateral aid during the study period is 29.3 percentage. The figure 4.1(a) shows the trend line of the bilateral aid and figure 4.1(b) shows the trend line of the growth rate of bilateral aid.

**Table 4.1 Trend of Bilateral Aid from 1991 to 2016**

| Year | Gross Bilateral Aid (GBA) In Million | Growth Rate (in %) |
|---|---|---|
| 1991 | 2939.9 | |
| 1992 | 3597.3 | 22.36 |
| 1993 | 3638.5 | 1.15 |
| 1994 | 2627.1 | -27.80 |
| 1995 | 3988.7 | 51.83 |
| 1996 | 3533.3 | -11.42 |
| 1997 | 6012.7 | 70.17 |
| 1998 | 6297.7 | 4.74 |
| 1999 | 4167.6 | -33.82 |
| 2000 | 4929.1 | 18.27 |
| 2001 | 2771.2 | -43.78 |
| 2002 | 4675.3 | 68.71 |
| 2003 | 10044.4 | 114.84 |
| 2004 | 9013.2 | -10.27 |
| 2005 | 9230.8 | 2.41 |
| 2006 | 7658.4 | -17.03 |
| 2007 | 16406.4 | 114.23 |
| 2008 | 10207.7 | -37.78 |
| 2009 | 9333.1 | -8.57 |
| 2010 | 22901.5 | 145.38 |
| 2011 | 31820 | 38.94 |
| 2012 | 52913 | 66.29 |
| 2013 | 34519.9 | -34.76 |
| 2014 | 114555 | 231.85 |
| 2015 | 178369 | 55.71 |
| 2016 | 91069 | -48.94 |
| Average | 24893.06 | 29.31 |

**Source: Economic Survey, MoF, GoN, 2009/10 and 2016**.

**Figure 4.1(a) Trend Line of Gross Bilateral Aid**
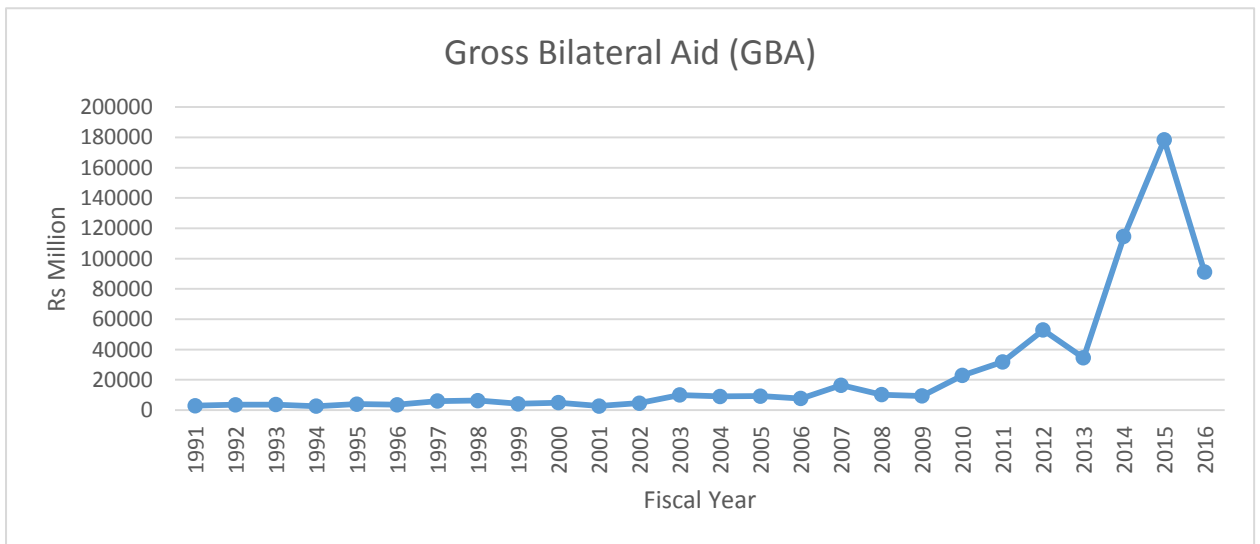


Gross Bilateral Aid (GBA)

**Figure 4.1(b) Trend Line of Growth Rate Gross Bilateral Aid**



Growth Rate of Bilaterail Aid
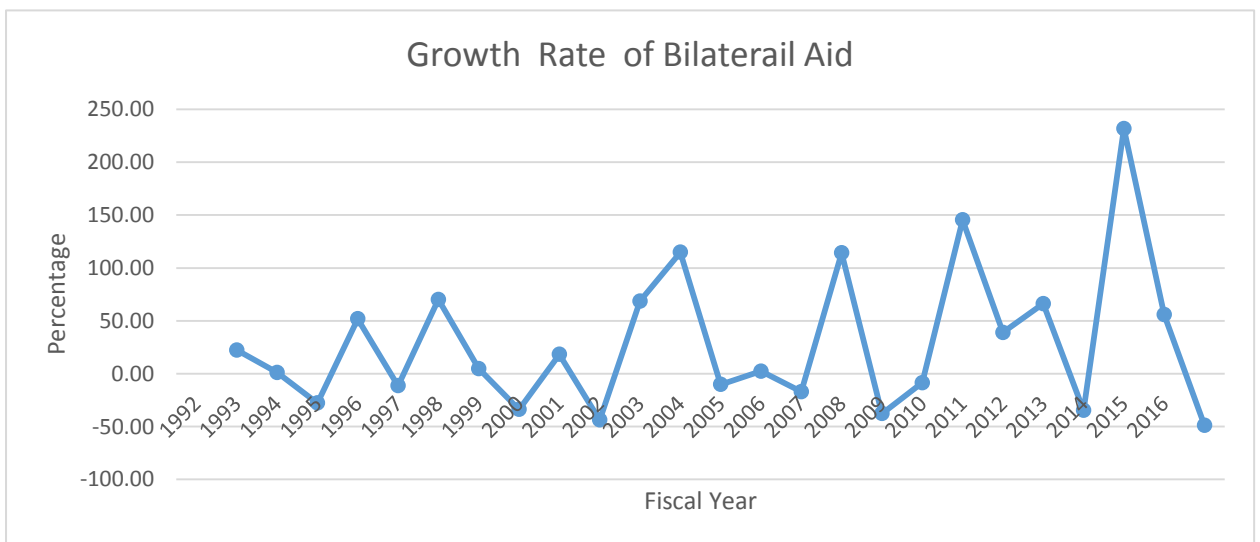
Figure 4.1(a) shows that the trend line of the bilateral aid which increasing very slow rate from 1991 to 2009 and increasing the rapid rate from 2010 to 2013 and fall in 2016. The figure 4.1(b) shows that the trend line of growth rate of bilateral aid which ups and down during the study period.

## 4.2 Multilateral Aid

Multilateral aid is given by the World Bank, Asian Development bank, International Monetary fund and other financial intuitions. The trend of gross multi-lateral aid is increasing slowly and growth rate of multilateral aid is ups and down during the study period. The multilateral aid was Rs 3050.1 million in 1991 and became Rs.104529.7 million in 2016. The average aid is Rs.25486.39 million during the study period. The growth rate was 37.80 percentage in 1991 and 120.29 percentage in 2016. The average growth rate 25 during the study period. The figure 4.2 (a) shows the trend line of gross multilateral aid and figure 4.2(b) shows the trend line of growth rate of multilateral aid.

**Table 4.2 Trend of Multilateral Aid from 1991 to 2016**

| Year | Goss Multilateral Aid (GMA) In million | Growth Rate ( in %) |
|---|---|---|
| 1991 | 3050.1 | |
| 1992 | 4203.1 | 37.80 |
| 1993 | 5597.1 | 33.17 |
| 1994 | 8930.1 | 59.55 |
| 1995 | 7260.7 | -18.69 |
| 1996 | 10755.7 | 48.14 |
| 1997 | 9019.2 | -16.14 |
| 1998 | 10159.4 | 12.64 |
| 1999 | 12021.4 | 18.33 |
| 2000 | 12594.8 | 4.77 |
| 2001 | 16026.2 | 27.24 |
| 2002 | 9709.5 | -39.41 |
| 2003 | 5841.1 | -39.84 |
| 2004 | 9899.2 | 69.47 |
| 2005 | 14426.5 | 45.73 |
| 2006 | 14383.4 | -0.30 |
| 2007 | 9447.9 | -34.31 |
| 2008 | 19092.9 | 102.09 |
| 2009 | 27018.6 | 41.51 |
| 2010 | 26867.9 | -0.56 |
| 2011 | 74276.7 | 176.45 |
| 2012 | 45275.7 | -39.04 |
| 2013 | 76636.9 | 69.27 |
| 2014 | 78172 | 2.00 |
| 2015 | 47450.3 | -39.30 |
| 2016 | 104529.7 | 120.29 |
| Average | 25486.39 | 25.63 |

**Source: Economic Survey, MoF, GoN, 2009/10 and 2016**.

**Figure 4.2(a) Trend line of Growth Rate Multilateral Aid**
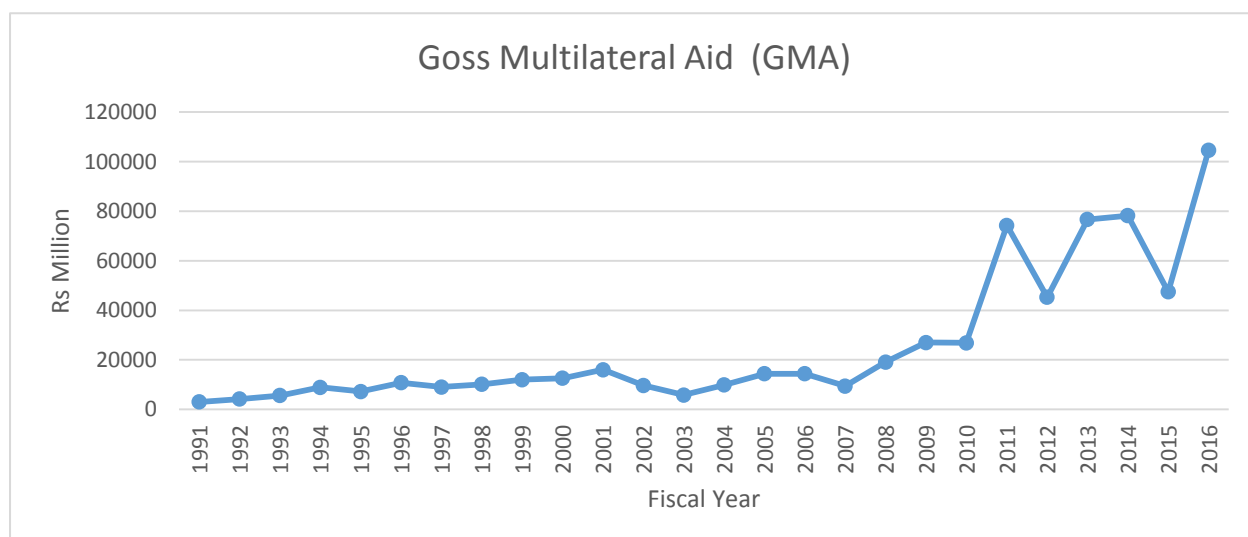


Goss Multilateral Aid (GMA)

**Figure 4.2 (b) Trend line of Growth Rate Gross Multilateral Aid**
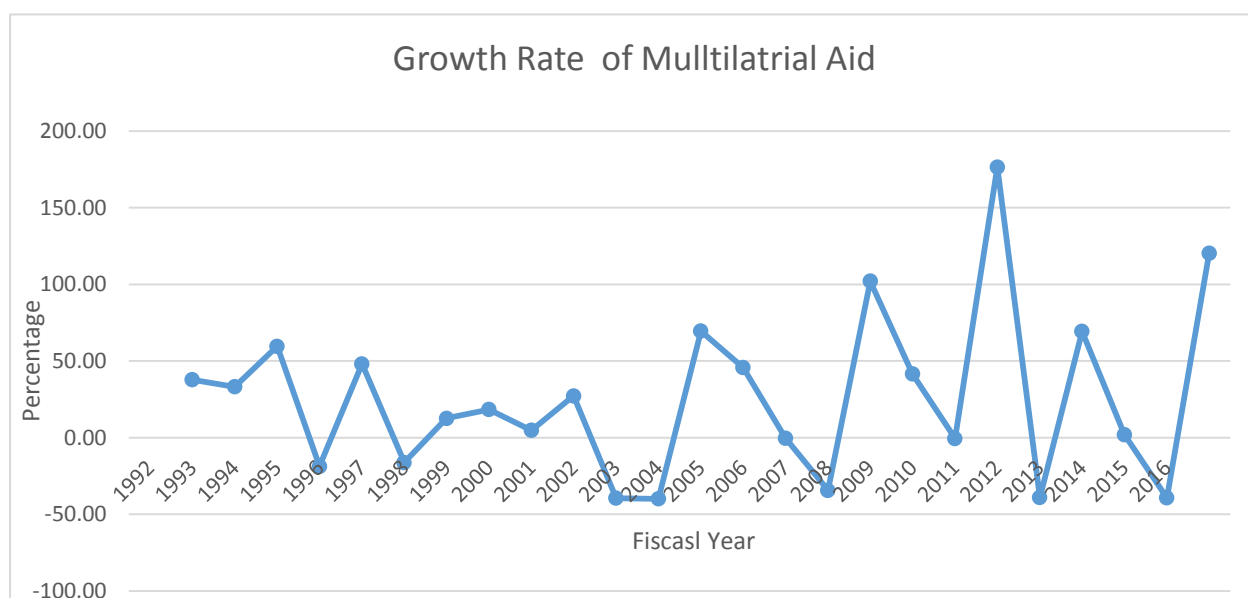


Growth Rate of Mulltilatrial Aid

Figure 4.2(a) shows that the trend line of multilateral aid. It is increasing at slow rate from 1991 to 2010 and ups and down from 2011 to 2016. The figure 4.2(b) shows the trend line of growth rates of multilateral aid during the study period. The growth rates are ups and down during the study period

## 4.3 Total Gross Aid

Budgetary system of Nepalese economy is always deficit. It means that expenditure is greater than revenue. Resources gap is fulfilled by foreign aid. Inflow foreign aid was Rs. 5990 million in 1991and Rs.195598.7 million in 2016. The average aid is Rs.50379.46 million during the study period. The growth rate is 30.22 percentage in 1991 and negative 13.1 percentage. The average growth rate of foreign aid is17.55 during the study period. Figure 4.3(a) shows the trend line of growth rate of foreign aid and figure 4.3(b) shows the trend line of growth rates of foreign aid.

**Table 4.3 Trend of Total Aid from 1991 to 2016**

| Year | Gross Foreign Aid (GFA) in million | Growth Rate ( % ) |
|---|---|---|
| 1991 | 5990 | |
| 1992 | 7800.4 | 30.22 |
| 1993 | 9235.6 | 18.40 |
| 1994 | 11557.2 | 25.14 |
| 1995 | 11249.4 | -2.66 |
| 1996 | 14289 | 27.02 |
| 1997 | 15031.9 | 5.20 |
| 1998 | 16457.1 | 9.48 |
| 1999 | 16189 | -1.63 |
| 2000 | 17523.9 | 8.25 |
| 2001 | 18797.4 | 7.27 |
| 2002 | 14384.8 | -23.47 |
| 2003 | 15885.5 | 10.43 |
| 2004 | 18912.4 | 19.05 |
| 2005 | 23657.3 | 25.09 |
| 2006 | 22041.8 | -6.83 |
| 2007 | 25854.3 | 17.30 |
| 2008 | 29300.6 | 13.33 |
| 2009 | 36351.7 | 24.06 |
| 2010 | 49769.4 | 36.91 |
| 2011 | 106096.7 | 113.18 |
| 2012 | 98188.7 | -7.45 |
| 2013 | 111156.8 | 13.21 |
| 2014 | 192727 | 73.38 |
| 2015 | 225819.3 | 17.17 |
| 2016 | 195598.7 | -13.38 |
| Average | 50379.46 | 17.55 |

**Source: Economic Survey, MoF, GoN, 2009/10 and 2016**.

**Figure 4.3(a) Trend line of Growth Rate Gross Multilateral Aid**
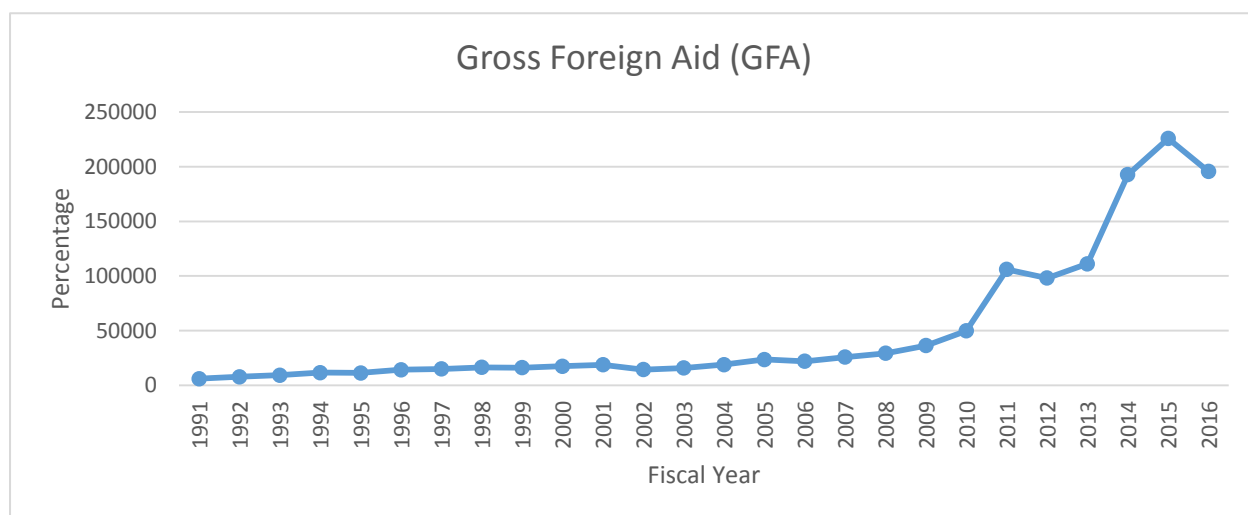


Source ： Based on Table 4.3

**Figure 4.3(b) Trend line of Growth Rate Gross Multilateral Aid**
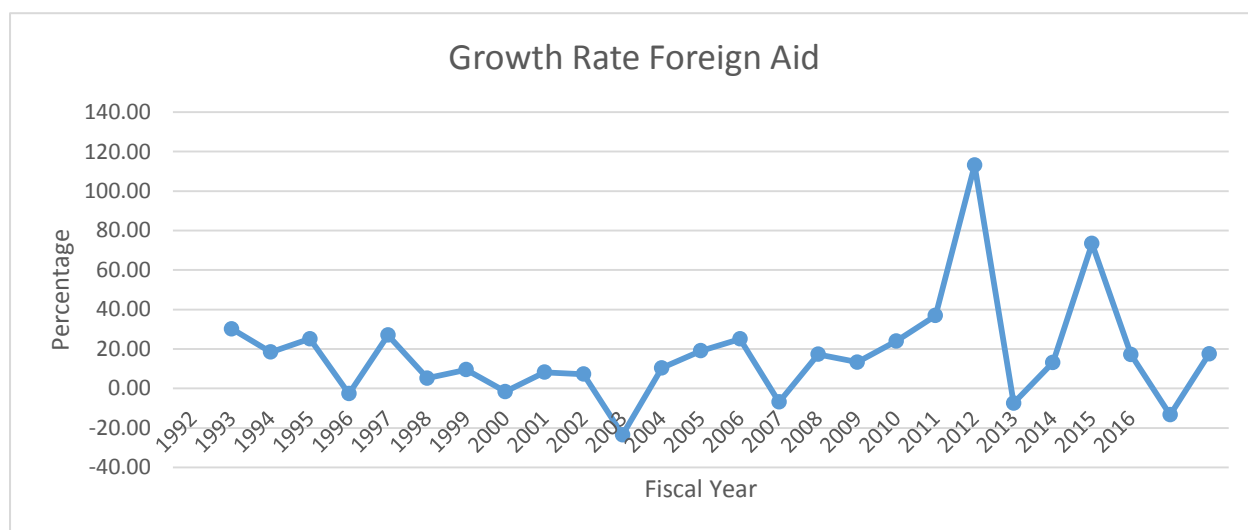


Source ： Based on Table 4.3

Figure 4.3(a) shows the trend line of the total foreign aid. The trend line is increasing at slow rate from 1991 to 2010 and increasing at rate from 2011 to 2016. The figure 4.3(b) shows the trend line of the growth rate of foreign aid which is ups and down during the study period.

## 4.4 Comparison Multilateral, Bilateral and Total Aid

The growth rate of total aid is increasing very slow rate each study period. However, the growth rate of multilateral and bilateral is ups and down during the study period. The growth rate of multilateral aid is greater than growth rate of bilateral from 1992 to 1994. The growth rate of bilateral lead to growth rate of multilateral aid in years 1995, 2000, 2001, 2002, 2003, 2007, 2010, 2014 and 2015. Remaining year the growth rate of multilateral aid lead to growth rate of bilateral aid.

**Figure 4.4 Trend line total, bilateral and multilateral aid from 1991 to 2016.**



Trend Line of growth rate of Multi-Bilaerail and Total Aid
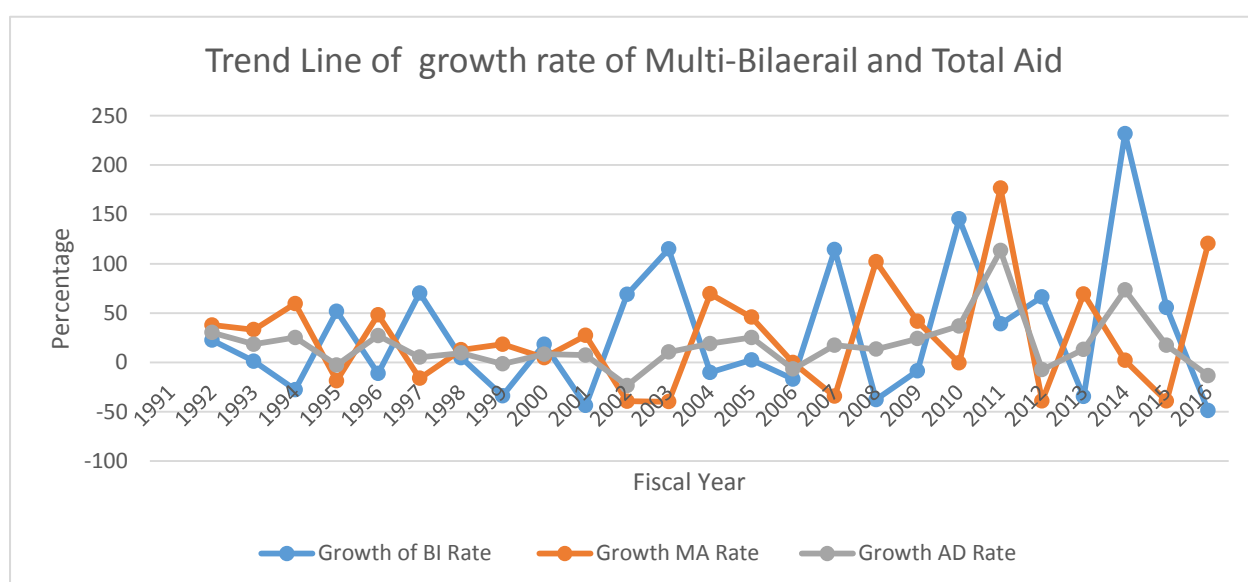
Source : Based on Table 4.2 and 4.3

The figure 4.4 shows that the trend line of the multilateral, bilateral and total aid of Nepal during the study period. The growth rate are ups and down during the study period.

## 4.5 Gross Domestic Product

Gross domestic product is final value goods and service produced by a nation during a fiscal year period. It is all economic activities made by domestic as well as foreign factor of production inside the country during a fiscal year period. The nominal GDP was Rs. 120370 million in 1991 and Rs.2248691 million in 2016. The nominal GDP is continues increasing during the study period. The average nominal GDP is Rs.777859.19 during the study period. The growth rate of real GDP is 4.48 percentage

in 1991 and 0.29 percentage in 2016. The average growth rate is 4.31 percentage during the study period. The growth rate of real GDP is ups and down during the study period. The figure 4.5 shows the trend line of growth rate of real GDP of Nepal.

**Table 4.5 Performance of Nominal, Real and growth rate of GDP from 1991 to 2016**

| YEAR | Gross Domestic Product in million | GDP Implicit Price Deflator (In Percent) | RGDP in million | GRGDP |
|---|---|---|---|---|
| 1991 | 120370 | 44 | 273568.18 | |
| 1992 | 149487 | 52.3 | 285826 | 4.48 |
| 1993 | 171492 | 57.7 | 297213.17 | 3.98 |
| 1994 | 199272 | 62 | 321406.45 | 8.14 |
| 1995 | 219175 | 65.9 | 332587.25 | 3.48 |
| 1996 | 258913 | 71.1 | 364153.31 | 9.49 |
| 1997 | 280513 | 76.2 | 368127.3 | 1.09 |
| 1998 | 300845 | 79.3 | 379375.79 | 3.06 |
| 1999 | 342036 | 86.3 | 396333.72 | 4.47 |
| 2000 | 379488 | 90.3 | 420252.49 | 6.04 |
| 2001 | 441519 | 100 | 441519 | 5.06 |
| 2002 | 459443 | 103.94 | 442027.13 | 0.12 |
| 2003 | 492231 | 107.13 | 459470.74 | 3.95 |
| 2004 | 536749 | 111.6 | 480957.89 | 4.68 |
| 2005 | 589412 | 118.86 | 495887.6 | 3.10 |
| 2006 | 654084 | 126.18 | 518373.75 | 4.53 |
| 2007 | 727827 | 135.38 | 537617.82 | 3.71 |
| 2008 | 815658 | 142.94 | 570629.63 | 6.14 |
| 2009 | 988272 | 165.77 | 596170.6 | 4.48 |
| 2010 | 1193679 | 189.56 | 629710.38 | 5.63 |
| 2011 | 1366954 | 211.65 | 645855.89 | 2.56 |
| 2012 | 1527344 | 224.13 | 681454.51 | 5.51 |
| 2013 | 1695011 | 237.77 | 712878.41 | 4.61 |
| 2014 | 1941624 | 259.77 | 747439.66 | 4.85 |
| 2015 | 2124250 | 272.74 | 778855.32 | 4.20 |
| 2016 | 2248691 | 287.87 | 781148.09 | 0.29 |
| Average | 777859.19 | 133.86 | 498416.93 | 4.31 |

**Source: Economic Survey, MoF, GoN, 2009/10 and 2016**.

**Figure 4.5 Trend line of Growth Rate Real GDP of Nepal from 1991 to 2016 in Nepal.**
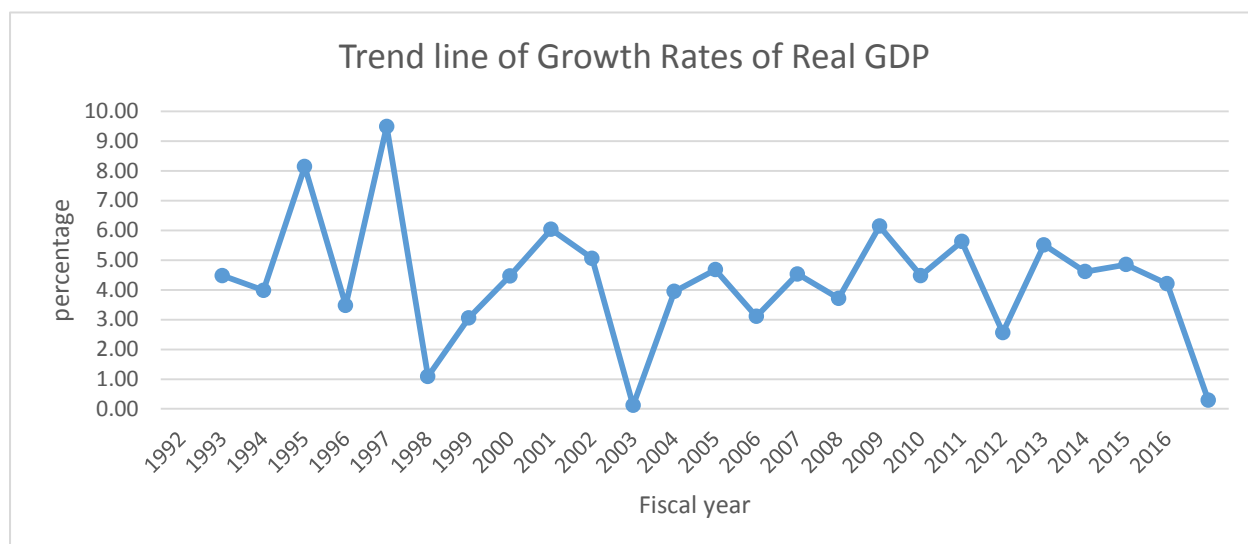


Source : Based on Table 4.5

The figure 4.5 shows that the trend line of growth rate of GDP of Nepal. The growth rates are ups and down during the study period. It means the growth rates are volatile during the study period.

**4.6 Percentage of Bilateral, Multilateral and Total Aid of GDP**

Another way of analysis is to calculate percentages shares of gross bilateral aid, gross multilateral aid and gross foreign aid. If the shares of gross bilateral aid, gross multilateral aid and gross foreign aid in GDP are large and such shares are increasing with passage of time, it is evidenced that gross bilateral aid, gross multilateral aid and gross foreign aid are remarkable enough to influence growth performance of the economy. The percentage of bilateral aid to GDP is increasing from 1percentage to 8 percentage. The share of percentage of multilateral aid is 1 percentage to 5 percentage and percentage of total aid is 2 percentage to 10 percentage. The figure 4.6 shows the trend line of share of all aid to GDP.

**Table 4.6 Percentage of Bilateral, Multilateral and Total Aid of GDP**

| Year | Bilateral/GDP | Multilateral/GDP | Total Aid/GDP |
|---|---|---|---|
| 1991 | 2.44 | 2.53 | 4.98 |
| 1992 | 2.41 | 2.81 | 5.22 |
| 1993 | 2.12 | 3.26 | 5.39 |
| 1994 | 1.32 | 4.48 | 5.80 |
| 1995 | 1.82 | 3.31 | 5.13 |
| 1996 | 1.36 | 4.15 | 5.52 |
| 1997 | 2.14 | 3.22 | 5.36 |
| 1998 | 2.09 | 3.38 | 5.47 |
| 1999 | 1.22 | 3.51 | 4.73 |
| 2000 | 1.30 | 3.32 | 4.62 |
| 2001 | 0.63 | 3.63 | 4.26 |
| 2002 | 1.02 | 2.11 | 3.13 |
| 2003 | 2.04 | 1.19 | 3.23 |
| 2004 | 1.68 | 1.84 | 3.52 |
| 2005 | 1.57 | 2.45 | 4.01 |
| 2006 | 1.17 | 2.20 | 3.37 |
| 2007 | 2.25 | 1.30 | 3.55 |
| 2008 | 1.25 | 2.34 | 3.59 |
| 2009 | 0.94 | 2.73 | 3.68 |
| 2010 | 1.92 | 2.25 | 4.17 |
| 2011 | 2.33 | 5.43 | 7.76 |
| 2012 | 3.46 | 2.96 | 6.43 |
| 2013 | 2.04 | 4.52 | 6.56 |
| 2014 | 5.90 | 4.03 | 9.93 |
| 2015 | 8.40 | 2.23 | 10.63 |
| 2016 | 4.05 | 4.65 | 8.70 |

**Source: Economic Survey, MoF, GoN, 2009/10 and 2016**.

**Figure 4.6 Trend Lines Share of Bilateral- Multilateral and Total Aid to GDP**
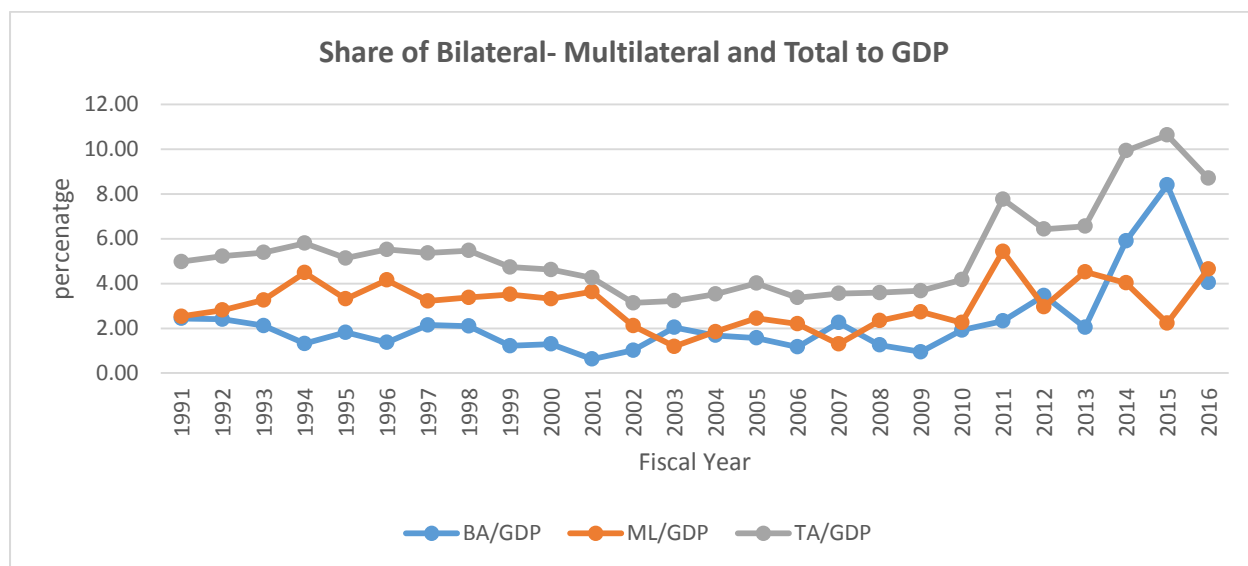


Source : Based on Table 4.2 , 4.3 and 4.5

Figure 4.6 shows the trend line ratio of total GDP to bilateral aid, multilateral and total aid. The trend line are ups and down during the study period. The trend line of GDP total aid is higher than both multilateral and bilateral aid. But trend line of GDP to multilateral aid more that bilateral aid from 1991 to2002 and less in 2003, 2007 ,2012 and 2015.

## 4.7 Empirical Results and Analysis

Under empirical results and analysis heading, four models which are proposed in the methodology are estimated. First, summary statistics, correlation analysis, unit root test results of all dependent and independent variables is presented. Second, regression results of each four models are estimated under separate sub-headings and result of each model are supported with inferential test statistics.

## 4.8 Summary Statistics of Variables

The study has four variables and each variable consists of 13 annual observations. Basically, Summary statistics includes mean, median, maximum, minimum, standard deviation, skewness, kurtosis and Jarque-Bera (JB) of each individual variable. However, this study presents the results based on statistical soft wear Eviews 7.0.

The positive values of kurtosis for all variables suggest that these variables frequency curves are peaked. The positive values of skewness all variables further indicate that they positively skewed. The JB statistics for each observations show that individual variables heterogeneous in the sense that some of the variables are normal and some are not normal. The overall summary statistics infer that all variables show somewhat similar characteristics. The summary statistics of variables are calculated in arithmetic scale (Table 4.7).

**Table: 4.7 :Summary Statistics of the Variables**

|  | BILATERAL | GDP | MULTI LATERAL AID | TOATL AID |
|---|---|---|---|---|
| Mean | 24893.07 | 777859.2 | 25486.39 | 50379.46 |
| Median | 8335.800 | 514490.0 | 12308.10 | 18854.90 |
| Maximum | 178369.0 | 2248691. | 104529.7 | 225819.3 |
| Minimum | 2627.100 | 120370.0 | 3050.100 | 5990.000 |
| Std. Dev. | 41786.42 | 652414.7 | 27884.47 | 64160.25 |
| Skewness | 2.524947 | 1.016495 | 1.561454 | 1.710659 |
| Kurtosis | 8.758590 | 2.742664 | 4.200879 | 4.565480 |
| Jarque-Bera | 63.55137 | 4.549206 | 12.12755 | 15.33582 |
| Probability | 0.000000 | 0.102838 | 0.002326 | 0.000468 |
| Sum | 647219.8 | 20224339 | 662646.1 | 1309866. |
| Sum Sq. Dev. | 4.37E+10 | 1.06E+13 | 1.94E+10 | 1.03E+11 |
| Observations | 26 | 26 | 26 | 26 |

Source: Economic Survey, MoF, GoN, 2009/10 and 2016.

## 4.8 Unit Root Results

Individual time series data must be stationary before running regression analysis.Otherwise the regression results will be spurious. Therefore, it is better to determine the order of integration of the variables under the study. The Augmented Dickey Fuller (ADF) test is used for this purpose at level and first difference. The unit

root results showed that all variables are suffered unit root at level. The test statistics clearly indicates that log level form series are spurious from unit root. Thus, first difference data are employed to unit root testing. The results show that the log level forms of data at first difference are completely unit root free and all series are integrated of orders one. Thus, log level forms of data at first difference are employed to empirical analysis, particularly empirical models. The unit root results are reported below (Table 4.8).

**Table 4.8 ADF Unit Root Results**

| Variables | Log Level Form | | Variables | First Difference | |
|-----------|-------------------|---------|-----------|---------------------|-----------|
| | $\tau$- statistics | p-value | | $\tau$- statistics | p-value |
| LNRGDP | -1.095701 | 0.7011 | DLNRGDP | -3.932155 | ( 0.0064) * |
| LNRBA | -0.470067 | 0.8815 | DLNRBA | -5.956102 | (0.0001)* |
| LNRMA | -0.938916 | 0.7584 | DLNRMA | -6.656105 | (0.0000)* |
| LNTAD | 0.241370 | 0.9698 | DLNTAD | -4.518965 | ( 0.0016) * |

Note: An asterisk denotes significant at 1 percent level.

Source: Own Calculations.

**4.9 Correlation between Dependent and Independent Variables**

Before moving into the cause and effect relationship between dependent and explanatory variables, it would be better to know about their association or strength of relationship. High degree of association between the variables satisfies necessary condition to test the cause and effect relationship of explanatory variables to dependent variable in regression analysis. Level form of data is used for correlation analysis. The

value of partial correlation lies between -1 to +1. Near to value +1 indicates that there is perfect positive correlation between the variables. Near value -1 indicates that there is negative autocorrelation between the variables. The correlation between GDP and bilateral is 0.84 which shows the higher degree positive correlation between the variables. The correlation between GDP and multilateral aid is 0.91 and correlation between GDP and total aid is 0.94 indicates that is higher degree positive correlation the variables.

**Table 4.9 Correlation coefficient among the variables**

|  | BILATERAL | GDP | MULTI | TOTAL |
|---|---|---|---|---|
| BILATERAL | 1 | 0.84 | 0.68 | 0.94 |
| GDP | 0.84 | 1 | 0.91 | 0.94 |
| MULTI | 0.68 | 0.91 | 1 | 0.87 |
| TOTAL | 0.94 | 0.94 | 0.87 | 1 |

**Sources: self-calculation**

## 4.11  Regression Analysis of  Bilateral Aid (BA) and Multilateral aid on GDP

In order to find the magnitude of relationship between economic growths, bilateral aid and multilateral, it is necessary to run the OLS regression with Nominal GDP dependent variable and bilateral and multilateral aid as independent.

**Table 4.10 Regression Results $\Delta$ $LNRGDP$ as Dependent Variable**

| Constant and Coefficients | Coefficients | Standard Error of Coefficients | t-statistics | P-value |
|---|---|---|---|---|
| Constant | -0.062259 | 0.047268 | -1.317138 | 0.2008 |
| ΔLNRBA | 0.564952 | 0.059473 | 9.499295 | (0.0000)* |
| ΔLNRMA | 0.693987 | 0.059096 | 11.74335 | (0.0000)* |
| $R^2$ = 0.99 | DW =  2.07     N = 39 after adjustments | | | |
| Adjusted $R^2$ = 0.99 | F=  1821.597  Probability of F statistics = ( 0.0000)* | | | |

Notes: * and ** denote the statistical significance at the 1 percent and 5 percent levels respectively.

Source: Own Calculations.

The coefficient ΔLNRBA and ΔLNRMA are statistically significant at 1 percent. The value of Adjusted $R^2$ is 0.99 which indicates that 99 percentage dependence of dependent variable GDP on independent variables   bilateral aid and multilateral aid. The value of F statistically is very high 1821.59 and its p value is significant at one percentage indicates that model is overall fit.

The coefficient of ΔLNRBA is 0.56 which indicates that one percentage increase in bilateral aid causes increase in GDP by 0.56 percentage.

 The coefficient of ΔLNRMA is 0.69 which indicates that one percentage increase multilateral aid cause increase in GDP by 0.69 percentage.

The value of DW test is 2.07 which is near to 2 indicates that there is no autocorrelation among the error terms. The value Breusch-Godfrey Serial Correlation LM Test observed R squared test is 0.62 and it p value is 0.73 which is more than five percentage conforms that there is no autocorrelations among errors terms.

The value of Heteroskedasticity Test: Breusch-Pagan-Godfrey Obs*R-squared test is 0.45 and its p value is 0.79 which is more than five percentage indicates that there variance of error terms are constant.

The value of JB normality test p value is 0.68 which is more than more than five percentage indicates that error terms are normally distributed.

# CHAPTER - V

# SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

## 5.1    Summary of Findings

Economic development of any country depends upon the utilization of available resources. Domestic resources are not sufficient to meet growing development needs of the people. Therefore country needs foreign aid to overcome the problems. To generate the employment, enhance the living standards and uplift of all domestic savings only needs huge amount of public expenditure, these makes the foreign aid as necessary thing in Nepal. As we belief foreign aid brings physical and financial as well as technical knowledge, skilled personal, organization expenditure, advanced production techniques for increasing productivity and market information. In the country like Nepal, we repeatedly hear the government being effortful to receive more foreign aid. Rapid increment in foreign aid is observed every year. Despite the constant flow of foreign aid, and decades of aid-financed development efforts, it remains one of the poorest countries in the world and the poorest in the South Asia with a low rate of economic growth. Further, most of the foreign aid channeled to agriculture sector. Therefore, this study attempts to empirically investigate the issue of aid effectiveness in Nepal both at the aggregate and disaggregated levels. Therefore, it investigates the nature of the aid-growth relationship in Nepal with the following specific objectives:

   I    To explore the trend of GDP, total foreign aid, bilateral and multilateral aid.

   II   To show the effects of bilateral, multilateral aid on GDP.

The study is very important to macroeconomists, academicians and policy makers in understanding the responsiveness of real GDP to the change gross bilateral, multilateral and overall foreign aid.

Summary statistics, simple correlations, and unit root test are carried out along with t, F, R- squared, adjusted R-squared and DW statistics to find out accurate coefficients of estimated regression equation. Serial correlation, hetoroscedastcity and normality of the error terms are carried out to detect parsimony in coefficients to check either classical assumption on error terms holds or not.

**Major findings are as follows :**

• Nepal receives foreign aid from two sources- bilateral and multilateral having both grants and loan. The annual average growth rates of Gross Bilateral Aid is Rs. 24893.1 million. Bilateral aid is Rs. 2939.9 million in 1991 and Rs. 91069 in 2016. The maximum bilateral aid is Rs. 178369 in 2015 and minimum bilateral aid is Rs. 2627.1 during the study period. The growth rate of bilateral aid is ups and down during the study period. The average growth rate of bilateral aid during the study period is 29.3 percentage.

• Multilateral aid is given by the World Bank, Asian Development bank, International Monetary fund and other financial intuitions. The trend of gross multi-lateral aid is increasing slowly and growth rate of multilateral aid is ups and down during the study period. The multilateral aid was Rs 3050.1 million in 1991 and became Rs.104529.7 million in 2016. The average aid is Rs.25486.39 million during the study period. The growth rate was 37.80 percentage in 1991 and 120.29 percentage in 2016.

• Budgetary system of Nepalese economy is always deficit. It means that expenditure is greater than revenue. Resources gap is fulfilled by foreign aid. Inflow foreign aid was Rs. 5990 million in 1991and Rs.195598.7 million in 2016. The average aid is Rs.50379.46 million during the study period. The growth rate is 30.22 percentage in 1991 and negative 13.1 percentage. The average growth rate of foreign aid is17.55 during the study period.

• The growth rate of total aid is increasing very slow rate each study period. However, the growth rate of multilateral and bilateral is ups and down during the study period. The growth rate of multilateral aid is greater than growth rate of bilateral from 1992 to 1994. The growth rate of bilateral lead to growth rate of multilateral aid in years

1995, 2000, 2001, 2002, 2003, 2007, 2010, 2014 and 2015. Remaining year the growth rate of multilateral aid lead to growth rate of bilateral aid.

• Gross domestic product is final value goods and service produced by a nation during a fiscal year period. It is all economic activities made by domestic as well as foreign factor of production inside the country during a fiscal year period. The nominal GDP was Rs. 120370 million in 1991 and Rs.2248691 million in 2016. The nominal GDP is continues increasing during the study period. The average nominal GDP is Rs.777859.19 during the study period. The growth rate of real GDP is 4.48 percentage in 1991 and 0.29 percentage in 2016. The average growth rate is 4.31 percentage during the study period. The growth rate of real GDP is ups and down during the study period. The figure 4.5 shows the trend line of growth rate of real GDP of Nepal.

•Another way of analysis is to calculate percentages shares of gross bilateral aid, gross multilateral aid and gross foreign aid. If the shares of gross bilateral aid, gross multilateral aid and gross foreign aid in GDP are large and such shares are increasing with passage of time, it is evidenced that gross bilateral aid, gross multilateral aid and gross foreign aid are remarkable enough to influence growth performance of the economy. The percentage of bilateral aid to GDP is increasing from 1percentage to 8 percentage. The share of percentage of multilateral aid is 1 percentage to 5 percentage and percentage of total aid is 2 percentage to 10 percentage. The figure 4.6 shows the trend line of share of all aid to GDP.

• The coefficient ΔLNRBA and ΔLNRMA are statistically significant at 1 percent. The value of Adjusted $R^2$ is 0.99 which indicates that 99 percentage dependence of dependent variable GDP on independent variables  bilateral aid and multilateral aid. The value of F statistically is very high 1821.59 and its p value is significant at one percentage indicates that model is overall fit.
The coefficient of ΔLNRBA is 0.56 which indicates that one percentage increase in bilateral aid causes increase in GDP by 0.56 percentage.

•The coefficient of ΔLNRMA is 0.69 which indicates that one percentage increase multilateral aid cause increase in GDP by 0.69 percentage.

- The value of DW test is 2.07 which is near to 2 indicates that there is no autocorrelation among the error terms. The value Breusch-Godfrey Serial Correlation LM Test observed R squared test is 0.62 and it p value is 0.73 which is more than five percentage conforms that there is no autocorrelations among errors terms.

- The value of Heteroskedasticity Test: Breusch-Pagan-Godfrey Obs*R-squared test is 0.45 and its p value is 0.79 which is more than five percentage indicates that there variance of error terms are constant.

- The value of JB normality test p value is 0.68 which is more than more than five percentage indicates that error terms are normally distributed.

## 5.3    Conclusions

Nepal is facing deficiency of capital. The exists high resource gap between revenue and expenditure due to deficiency of capital, adequate mobilization of internal resources could not have been made without foreign aid to accelerate the required growth rate of the economic growth and development. Therefore, foreign aid both bilateral and multilateral is continuously increasing. Even though foreign aid is increasing, its growth rates and shares in gross domestic output are highly volatile. In the early period bilateral aid took large share of gross aid. In the later period multilateral aid has higher share in overall aid. Although economic growth rates measured in term of real gross domestic product are low and unstable in Nepal, they are positively related with gross bilateral aid, multilateral aid and foreign aid.

For a low- income country such as Nepal, opportunities for increased revenue mobilization are limited. In this context, foreign aid can make a important contribution to augment the resources available to the country for development purpose. Foreign aid can used to finance project that directly bring increased government revenue, which will bring improvements in the domestic revenue mobilization capacity by raising GDP.

## 5.4    Recommendations

The rationale for foreign aid is that it assists a developing country to achieve rapid economic growth and poverty reduction. In the case of Nepal, foreign aid can help achieve targeted economic growth by improving aid effectiveness of aid through the design and implementation of appropriate and consistent foreign aid policies compatible with national interests. More precisely, aid should be channeled to the sectors where aid can have relatively high economic and social returns. Based on the above descriptive and econometric analysis, the following recommendations are prescribed:

i. The gross foreign aid has positively contributed to the real GDP of the country both in short and long run. Therefore, it is recommended to the concerned agencies to formulate economic policies that encouraging greater foreign aid with long term investment plan.

ii. Both the gross bilateral and multilateral aids have positively contributed to the GDP of the country both in short and long run. Thus, there is not any obligation for concerned agencies taking aid whether from bilateral partners or multilateral agencies. Concerned agencies can receive any of both aids which are less costly. Short term and long term investment plans may be fruitful with formulation of bilateral and multilateral aid encouraging policies.

iii. Nepal's main source of income and employment is the agricultural sector. Yet most of Nepal's poor live in rural areas. Thus, in the context of Nepal, poverty reduction that is enhanced by rapid economic growth can be achieved through productivity growth in Nepal's agricultural sector. Despite some efforts in the past, the agricultural sector is still far behind in lifting the living standard of the majority of the Nepalese.

iv. Though Nepal's foreign aid is of highly concessional nature and has the long term maturity, certain factors such as the continuous depreciation of the Nepalese currency increased debt servicing resulting in the higher budget deficit, crowding out effects of such debt servicing on private sector investment, higher portion of loans than grants, substantial multilateral credits than bilateral ones and the inflationary effect of foreign borrowing, among others, should be watched carefully.

# REFERENCES

Acharya, K.P. (1998). *A review of foreign aid in Nepal*. Kathmandu, Nepal: Citizen's Poverty Watch Forum.

Bacha, E.L. (1990). A three-gap model of foreign transfers and the gdp growth rate in developing countries. *Journal of Development Studies,* 32, 276-96.

Basnet, D. (2013). *A study of foreign aid with special reference to Japan* ( Unpublished master's thesis ), Central Department of Economics, Tribhuvan University Kirtipur, Kathmandu, Nepal.

Bhattarai, B.P. (2007). Foreign aid and government's fiscal behaviour in Nepal: An empirical analysis. *Economic Analysis and Policy,* 37 (1). Retrieved from http:// www.sciencedirect.com/science/article/pii/S0313592607500032

CBS /NPC (Central Bureau of Statistics/National Planning  Commission ) (2007). *National Accounts of Nepal, 2000-2007.* Kathmandu, Nepal: CBS /NPC .

CBS/ NPC (Central Bureau of Statistics/ National  Planning  Commission ) (2013). *National Accounts of Nepal, 2012/13*, Kathmandu, Nepal: CBS /NPC.

CBS/NPC (Central Bureau of Statistics/ National Planning Commission ) (2016). *National Accounts of Nepal , 2016.* Kathmandu, Nepal: CBS/NPC

CBS/NPC (Central Bureau of Statistics/National Planning Commission ) (2016). Statistical Pocket Book., Kathmandu, Nepal: CBS/NPC.

Cecen, A. Xiao, L., & Adhikari, S. (2014). Institutions, economic growth, and foreign aid in Nepal. *International Journal of Economics and Finance*, 6, (6).

Chenery , H. B., & Bruno, M. (1962). Development alternatives in an open economy: The case of Israel. *Economic Journal*. 72(285), 79-103.

Chenery, H. B. & Strout, A. M. (1966). Foreign assistance and economic development. *American Economic Review*, 56 (4), 679-733.

Dhungel, K. R. (2015, March). *Contribution of foreign aid in Nepalese economy*. Kathmandu ,Nepal : New Business Age.

Durbarry, R. (1998). The impact of foreign aid on growth and savings in developing countries (Unpublished doctoral thesis). University of Nottingham, United Kingdom.

Easterly, W. (2003). Can foreign aid buy growth? *Journal of Economic Perspectives*, 17 (3), 23-48.

Ekanayake, E.M., & Chatrna, D. (2007). The effect of foreign aid on economic growth in developing countries. *Journal of International Business and Cultural Studies*. Retrieved from http://www.aabri.com/manuscripts/09359.pdf

Enders, W. (2008). *Applied Econometrics - Time Series*. New Delhi, India : Wiley.

Fei, J. C., & Paauw, D. S. (1965). Foreign assistance and self-help: A reappraisal of development finance. *The Review of Economics and Statistics*, 251-267.

Galiani, S., Knack, S., Xu, L.C., & Zou, B. (2016). The effect of aid on growth: evidence from a quasi-experiment. *Research .Working Paper No. 22164*. Cambridge,England: National Bureau of Economic. Retrieved from

https://www. nber.org/papers/w22164

Gong, L. ,& Zou, H. (2001). Foreign aid reduces labor supply and capital accumulation. *Review of Development Economics,* 5 (1), 105-118.

Gujarati, D. N. (2004). Basic econometrics. (3rd ed.). Delhi, India : Tata Mc Grew-Hill Education Private Limited.

Hossain, B. (2014). The effect of foreign aid on the economic growth of Bangladesh. *Journal of Economics and Development Studies*, . 2( 2), 93-105.

Jeffrey, M., & Wooldridge, R. (2006). *Introductory econometrics: A modern approach* ( 3rd ed .). New Delhi, India: Cengage Learning India Private Limited.

Jeffrey, S.B. (2015). Is All Foreign aid the same? : An empirical comparison of the effect of multilateral and bilateral aid on growth. *Under Graduate Economic Review*. 12 (1). Retrieved from

https:// digitalcommons. iwu. edu/ uer/ vol12/ iss1/3/pdf

Kabete, C. N. (2008). Foreign aid and economic growth: the case of Tanzania ( Unpublished   masters' thesis ) . Institute of Social Studies, Graduate School of   Development Studies, Department of Economics   Sustainable Development, The    Hague, The Netherlands.

Karkee, R. , & Comfort, J. (2016). *NGOs, foreign aid, and development in Nepal*. Frontiers in Public Health, doi: 103389/fpubh.2016.00177.

Karna, S.K. (2007). An inflow of foreign aid in Nepal. *The Economic Journal of Nepal*, 30 (4).: Central Department of Economics, Tribhuvan University,Kirtipur Kathmandu, Nepal.

Khadka, N. (1991). Foreign aid, poverty and stagnation in Nepal.  New Delhi, India: Vikas Publishing House Pvt. Ltd.

Lansink, R. , & White, H. (2001). Are there negative returns to aid? *Journal of Development  Studies, 37 (6), 42-65.*

Lucas, R. E. (1990). Why doesn't capital flow from rich to poor countries? *American Economic Review, 80, 92-96.*

McKinnon, R. I. (1964). Foreign exchange constraints in economic development and efficient aid allocation. *The Economic Journal, 388-409.*

MoF/GoN (Ministry of Finance/Government of Nepal ). (2016). *Economic Survey, FY 2016-17.* Kathmandu: MoF/, GoN.

Morrissey, O. (2001). Does aid increase growth ? *Progress in Development Studies,* 1(1), 37-50.

Mukherjee, S. (2015). *Contemporary development economics [Adam Smith to Amartya Sen].* Kolkata, India: New Central Book Agency (P) Ltd.

Pearce, D. W. (1996). *MacMillan dictionary of economics*. London, England : MacMillan.

Phull, K. S. (2007). *Foreign aid in India: Effectiveness and policy.* New Delhi, India: Deep and Deep Publications.

Poudyal, S. R. (1982). *Impact of foreign aid on Nepal's development*. Kathmandu, Nepal : Center for Economic Development and Administration. (CEDA), Tribhuvan University, Kirtipur.

Poudyal, S.R. (1988). *Foreign trade, aid and development in Nepal*. New Delhi, India : Common Wealth Publishers.

Pyakuryal, B., Adhikari D., & Dhakal, D.P. (2008). *Is foreign aid working*? Kathmandu,Nepal: Mandala Book Point.

Raghuran, G. R., & Subramanian, A. (2005). What undermines aid's impact on growth? *IMF Working Paper 05/126. Washington, DC :The World Bank.*

Rodan, P. (1961). International aid for underdevelopment countries. *Review of Economics and Statistics*,43, (2), 107-138. Massachusetts, USA: Harvard University Press.

Rostow, W. W. (1956). The take-off into self-sustained growth. *The Economic Journal*, 25-48.

Sigdel, B. (2004). Nepalese economy, foreign aid in Nepal. In M.K. Dahal (Ed.). Nepalese Economy Towards Building a Strong Economic Nation-State

Kathmandu. Kathmandu Nepal : CEDECON and   New Hira Books enterprises.

Sigdel, B.(2010). Dimensions of Nepalese economy. *Nepal Human Actions for Rapid Development.*

Solow, R. M. (1956). A contribution to the theory of economic growth. *A Quarterly Journal of Economics*, 70, 65-94.

Solow, R. M. (1957). Technical change and the aggregate production function. *Review of Economics and Statistics,* 39, 312-320.

Thirlwall, A.P. (1999*). Growth and development with special reference to developing economies.* London, England:SAGE.

Thirlwall, A.P. (2003). *The mobilization of savings for growth and development in developing countries*. London, England: SAGE.

Todaro, M. P., & Smith, S. C. (2003). *Economic development (8th ed .).* New Delhi, India: Pearson Education.

White, J. A. (1974). *The politics of foreign aid*.

# Appendix I

Heteroskedasticity Test: Breusch-Pagan-Godfrey

| | | | |
|---|---|---|---|
| F-statistic | 0.207092 | Prob. F(2,23) | 0.8144 |
| Obs*R-squared | 0.459926 | Prob. Chi-Square(2) | 0.7946 |
| Scaled explained SS | 0.735726 | Prob. Chi-Square(2) | 0.6922 |

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/11/18   Time: 09:58
Sample: 1991 2016
Included observations: 26

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.052263 | 0.021274 | 2.456647 | 0.0220 |
| DLNBAD | -0.000310 | 0.026767 | -0.011567 | 0.9909 |
| DLNMAD | 0.006219 | 0.026598 | 0.233817 | 0.8172 |

| | | | |
|---|---|---|---|
| R-squared | 0.017689 | Mean dependent var | 0.050439 |
| Adjusted R-squared | -0.067729 | S.D. dependent var | 0.104007 |
| S.E. of regression | 0.107471 | Akaike info criterion | -1.515023 |
| Sum squared resid | 0.265651 | Schwarz criterion | -1.369858 |
| Log likelihood | 22.69530 | Hannan-Quinn criter. | -1.473221 |
| F-statistic | 0.207092 | Durbin-Watson stat | 1.927963 |
| Prob(F-statistic) | 0.814444 | | |

Breusch-Godfrey Serial Correlation LM Test:

| | | | |
|---|---|---|---|
| F-statistic | 0.258301 | Prob. F(2,21) | 0.7748 |
| Obs*R-squared | 0.624245 | Prob. Chi-Square(2) | 0.7319 |

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 08/11/18   Time: 09:57
Sample: 1991 2016
Included observations: 26
Presample missing value lagged residuals set to zero.

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| DLNBAD | 0.007992 | 0.063190 | 0.126474 | 0.9006 |
| DLNMAD | -0.010872 | 0.063999 | -0.169873 | 0.8667 |
| C | 0.000114 | 0.048883 | 0.002331 | 0.9982 |
| RESID(-1) | -0.045614 | 0.217768 | -0.209461 | 0.8361 |
| RESID(-2) | -0.157582 | 0.228336 | -0.690136 | 0.4977 |

| | | | |
|---|---|---|---|
| R-squared | 0.024009 | Mean dependent var | 1.65E-17 |
| Adjusted R-squared | -0.161894 | S.D. dependent var | 0.229035 |
| S.E. of regression | 0.246879 | Akaike info criterion | 0.211207 |
| Sum squared resid | 1.279937 | Schwarz criterion | 0.453148 |
| Log likelihood | 2.254311 | Hannan-Quinn criter. | 0.280877 |
| F-statistic | 0.129150 | Durbin-Watson stat | 1.868263 |
| Prob(F-statistic) | 0.970103 | | |

Dependent Variable: DLNGDP
Method: Least Squares
Date: 08/11/18   Time: 09:53
Sample: 1991 2016
Included observations: 26

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| --- | --- | --- | --- | --- |
| DLNBAD | 0.564952 | 0.059473 | 9.499295 | 0.0000 |
| DLNMAD | 0.693987 | 0.059096 | 11.74335 | 0.0000 |
| C | -0.062259 | 0.047268 | -1.317138 | 0.2008 |

| | | | | |
| --- | --- | --- | --- | --- |
| R-squared | 0.993726 | Mean dependent var | | -0.449936 |
| Adjusted R-squared | 0.993181 | S.D. dependent var | | 2.891647 |
| S.E. of regression | 0.238785 | Akaike info criterion | | 0.081663 |
| Sum squared resid | 1.311424 | Schwarz criterion | | 0.226828 |
| Log likelihood | 1.938381 | Hannan-Quinn criter. | | 0.123465 |
| F-statistic | 1821.597 | Durbin-Watson stat | | 2.076773 |
| Prob(F-statistic) | 0.000000 | | | |

Null Hypothesis: D(LNTAD) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

|  |  | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic |  | -4.518965 | 0.0016 |
| Test critical values: | 1% level | -3.737853 |  |
|  | 5% level | -2.991878 |  |
|  | 10% level | -2.635542 |  |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNTAD,2)
Method: Least Squares
Date: 08/11/18   Time: 09:30
Sample (adjusted): 1993 2016
Included observations: 24 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(LNTAD(-1)) | -0.996801 | 0.220582 | -4.518965 | 0.0002 |
| C | 0.133762 | 0.055225 | 2.422123 | 0.0241 |

| R-squared | 0.481389 | Mean dependent var | -0.016990 |
|---|---|---|---|
| Adjusted R-squared | 0.457816 | S.D. dependent var | 0.292812 |
| S.E. of regression | 0.215607 | Akaike info criterion | -0.151067 |
| Sum squared resid | 1.022696 | Schwarz criterion | -0.052896 |
| Log likelihood | 3.812809 | Hannan-Quinn criter. | -0.125023 |
| F-statistic | 20.42104 | Durbin-Watson stat | 1.931103 |
| Prob(F-statistic) | 0.000170 |  |  |

Null Hypothesis: LNTAD has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

|  |  | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic |  | 0.241370 | 0.9698 |
| Test critical values: | 1% level | -3.724070 |  |
|  | 5% level | -2.986225 |  |
|  | 10% level | -2.632604 |  |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNTAD)
Method: Least Squares
Date: 08/11/18   Time: 09:29
Sample (adjusted): 1992 2016
Included observations: 25 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LNTAD(-1) | 0.010637 | 0.044067 | 0.241370 | 0.8114 |
| C | 0.031464 | 0.449352 | 0.070021 | 0.9448 |

| | | | | |
|---|---|---|---|---|
| R-squared | 0.002527 | Mean dependent var | | 0.139439 |
| Adjusted R-squared | -0.040842 | S.D. dependent var | | 0.208055 |
| S.E. of regression | 0.212262 | Akaike info criterion | | -0.185376 |
| Sum squared resid | 1.036265 | Schwarz criterion | | -0.087866 |
| Log likelihood | 4.317199 | Hannan-Quinn criter. | | -0.158331 |
| F-statistic | 0.058259 | Durbin-Watson stat | | 1.930647 |
| Prob(F-statistic) | 0.811407 | | | |

Null Hypothesis: D(LNMAD) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -6.656105 | 0.0000 |
| Test critical values: | 1% level | -3.737853 | |
| | 5% level | -2.991878 | |
| | 10% level | -2.635542 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNMAD,2)
Method: Least Squares
Date: 08/11/18   Time: 09:28
Sample (adjusted): 1993 2016
Included observations: 24 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(LNMAD(-1)) | -1.385792 | 0.208199 | -6.656105 | 0.0000 |
| C | 0.178019 | 0.087731 | 2.029157 | 0.0547 |

| | | | | |
|---|---|---|---|---|
| R-squared | 0.668194 | Mean dependent var | | 0.019548 |
| Adjusted R-squared | 0.653112 | S.D. dependent var | | 0.702344 |
| S.E. of regression | 0.413661 | Akaike info criterion | | 1.152116 |
| Sum squared resid | 3.764541 | Schwarz criterion | | 1.250287 |
| Log likelihood | -11.82539 | Hannan-Quinn criter. | | 1.178161 |
| F-statistic | 44.30374 | Durbin-Watson stat | | 2.115770 |
| Prob(F-statistic) | 0.000001 | | | |

Null Hypothesis: LNMAD has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -0.938916 | 0.7584 |
| Test critical values: | 1% level | -3.724070 | |
| | 5% level | -2.986225 | |
| | 10% level | -2.632604 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNMAD)
Method: Least Squares
Date: 08/11/18   Time: 09:27
Sample (adjusted): 1992 2016
Included observations: 25 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LNMAD(-1) | -0.091766 | 0.097736 | -0.938916 | 0.3575 |
| C | 1.022151 | 0.941988 | 1.085100 | 0.2891 |

| | | | | |
|---|---|---|---|---|
| R-squared | 0.036914 | Mean dependent var | | 0.141372 |
| Adjusted R-squared | -0.004959 | S.D. dependent var | | 0.427471 |
| S.E. of regression | 0.428530 | Akaike info criterion | | 1.219707 |
| Sum squared resid | 4.223676 | Schwarz criterion | | 1.317217 |
| Log likelihood | -13.24634 | Hannan-Quinn criter. | | 1.246752 |
| F-statistic | 0.881564 | Durbin-Watson stat | | 2.461476 |
| Prob(F-statistic) | 0.357530 | | | |

Null Hypothesis: D(LNBAD) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.956102 | 0.0001 |
| Test critical values: | 1% level | -3.737853 | |
| | 5% level | -2.991878 | |
| | 10% level | -2.635542 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNBAD,2)
Method: Least Squares
Date: 08/11/18   Time: 09:25
Sample (adjusted): 1993 2016
Included observations: 24 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(LNBAD(-1)) | -1.297041 | 0.217767 | -5.956102 | 0.0000 |
| C | 0.185455 | 0.107606 | 1.723462 | 0.0988 |

| | | | | |
|---|---|---|---|---|
| R-squared | 0.617226 | Mean dependent var | | -0.036419 |
| Adjusted R-squared | 0.599827 | S.D. dependent var | | 0.781807 |
| S.E. of regression | 0.494565 | Akaike info criterion | | 1.509379 |
| Sum squared resid | 5.381079 | Schwarz criterion | | 1.607550 |
| Log likelihood | -16.11255 | Hannan-Quinn criter. | | 1.535424 |
| F-statistic | 35.47515 | Durbin-Watson stat | | 2.066472 |
| Prob(F-statistic) | 0.000005 | | | |

Null Hypothesis: LNBAD has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

|  |  | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic |  | -0.470067 | 0.8815 |
| Test critical values: | 1% level | -3.724070 |  |
|  | 5% level | -2.986225 |  |
|  | 10% level | -2.632604 |  |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNBAD)
Method: Least Squares
Date: 08/11/18   Time: 09:24
Sample (adjusted): 1992 2016
Included observations: 25 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LNBAD(-1) | -0.041588 | 0.088473 | -0.470067 | 0.6427 |
| C | 0.518810 | 0.817719 | 0.634460 | 0.5320 |
| R-squared | 0.009516 | Mean dependent var | | 0.137330 |
| Adjusted R-squared | -0.033549 | S.D. dependent var | | 0.493309 |
| S.E. of regression | 0.501516 | Akaike info criterion | | 1.534256 |
| Sum squared resid | 5.784922 | Schwarz criterion | | 1.631766 |
| Log likelihood | -17.17820 | Hannan-Quinn criter. | | 1.561301 |
| F-statistic | 0.220963 | Durbin-Watson stat | | 2.339045 |
| Prob(F-statistic) | 0.642734 | | | |

Null Hypothesis: D(LNGDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

|  |  | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic |  | -3.932155 | 0.0064 |
| Test critical values: | 1% level | -3.737853 |  |
|  | 5% level | -2.991878 |  |
|  | 10% level | -2.635542 |  |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNGDP,2)
Method: Least Squares
Date: 08/11/18   Time: 09:22
Sample (adjusted): 1993 2016
Included observations: 24 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(LNGDP(-1)) | -0.737602 | 0.187582 | -3.932155 | 0.0007 |
| C | 0.081569 | 0.023760 | 3.433033 | 0.0024 |

| | | | | |
|---|---|---|---|---|
| R-squared | 0.412736 | Mean dependent var | | -0.006655 |
| Adjusted R-squared | 0.386042 | S.D. dependent var | | 0.048890 |
| S.E. of regression | 0.038308 | Akaike info criterion | | -3.606674 |
| Sum squared resid | 0.032285 | Schwarz criterion | | -3.508503 |
| Log likelihood | 45.28009 | Hannan-Quinn criter. | | -3.580629 |
| F-statistic | 15.46184 | Durbin-Watson stat | | 1.985007 |
| Prob(F-statistic) | 0.000712 | | | |

Null Hypothesis: LNGDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -1.095701 | 0.7011 |
| Test critical values: | 1% level | -3.724070 | |
| | 5% level | -2.986225 | |
| | 10% level | -2.632604 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNGDP)
Method: Least Squares
Date: 08/11/18   Time: 09:21
Sample (adjusted): 1992 2016
Included observations: 25 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LNGDP(-1) | -0.011597 | 0.010584 | -1.095701 | 0.2846 |
| C | 0.269747 | 0.139583 | 1.932524 | 0.0657 |