CHAPTER - I

INTRODUCTION

1.1 Background of the Study

Inflation is a persistent and appreciable rise in the general price level. Inflation measures how much more expensive a set (basket) of goods and services has become over a certain period, usually a year. Inflation is typically a broad measure of overall increase in prices of goods and services and thereby increases in cost of living in a country. But it can also be more narrowly calculated, for example, for certain goods, such as food, or for services, such as school tuition. Whatever the context, inflation represents how much more expensive the relevant set of goods and/or services has become over a certain period, most commonly a year (Oner, 2017).

GDP measures the monetary value of final goods and services which are bought by the final user produced in a country in a given period of time. It counts all of the output generated within the borders of a country. GDP is composed of goods and services produced for sale in the market and also include some nonmarket production, such as defense or education services provided by the government. An alternative concept, gross national product (GNP) counts all output of the residents of a country. So, if a German-owned company has a factory in the United States, the output of this factory would be included in U.S. GDP, but in German GNP. Not all productive activity is included in GDP. For example, unpaid work (such as that performed in the home or by volunteers) and black-market activities are not included because they are difficult to measure and value accurately. That means a baker who produces bread for a customer would contribute to GDP, but would not contribute to GDP if he baked the same loaf for his family although the ingredients he purchased would be counted (Callen, 2017).

The relationship between inflation and economic growth is one of the most popular macroeconomic issues among the national planner, policy makers, central bankers and macroeconomists (Barro, 1995). There exists a large debate in the relationship between these two macroeconomic variables both theoretically and empirically. The relationship

between economic growth and inflation rate has continued to generate series of debates among scholars; some of them confirm the existence of either a positive or negative relationship between these two major macroeconomic variables. Moreover, with time a general consensus evolved that low and stable inflation promotes economic growth and vice versa (Mubarik, 2005).

The level at which prices of goods and services increases and relatively purchasing power of people decreases is called inflation, while economic growth measures the level of increase in the capacity of an economy to produce goods and services, compared from one period of time to another and it is conventionally measured as the percent rate of increase in real Gross Domestic Product or real GDP. The fundamental objective of macroeconomic policies in both the developing and developed countries is to sustain high economic growth together with very low inflation (Chimobi, 2010). High inflation rate is and could hardly be favorable to economic growth (Niyimbanira, 2013). The consequence of inflation can easily be inferred. Given constant set of prices today, a situation of relatively much more chasing the same bundle of goods and services tomorrow with constant real wage income simply implies adjustment in consumption patterns. The same bundle of goods and services consumed today cannot therefore be consumed tomorrow. Hence a decrease in consumption capacity and standard of living is imminent (Maku & Adelowokan, 2013). Inflation may also reduce a country's international competitiveness by making its exports relatively more expensive, which impacts on the balance of payments.

GDP is the monetary value of all the finished goods and services produces within a country's borders in a specific time period. GDP includes all private and public consumption, government outlays, investments, private inventories, paid in construction costs and the foreign trade that is exports are added, imports are subtracted. Put simply, GDP is a broad measurement of a nation's overall economic activity. National policy makers aim to achieve high economic growth and very low inflation in their economies. The relationship between inflation and growth remains a controversial one in both theory and empirical findings. Originating in the Latin American context in the 1950s, the issue has generated an enduring debate between structuralists and monetarists. The structuralists believe that inflation is essential

for economic growth, whereas the monetarists see inflation as detrimental to economic progress (Mallik, 2001). *Inflation is a persistent and appreciable rise in the general level of prices (Shapiro, 1990). Inflation is assuredly something that we want to control.*

A price rise of 2 percent to 3 percent per annum in the developed and 4 percent -5 percent in developing economies may be considered as the desirable rate of inflation (Dwivedi, 2010). A sustained high growth rate of output and low inflation are the two main goals of the majority of macroeconomic policies. Price stability is a key factor in determining the growth rate of an economy. Many countries central bank have adopted to maintain inflation in desirable rate through monetary policy transmission mechanism. Very high inflation affects the economy drastically. GDP is commonly used as an indicator of the economic health of a country, as well as a gauge of a country's standard of living. In this way, a nation's GDP from any period can be measured as a percentage relative to previous periods. An important statistic that indicates whether an economy is expanding or contracting, GDP can be tracked over long spans of time and used in measuring a nation's economic growth or decline, as well as in determining if an economy is in recession.

There are different schools of thought who view inflation differently. For the classical economists, inflation is the only monetary phenomenon. In the classical and neo-classical economic analysis, inflation is viewed as proportionate to money supply. The classical and neo-classical economic analysis of inflation is based on the assumption of constant money demand function. So that in their sense, general price level is determined proportionately to nominal money supply. Thus, quantity theory of money states that the central bank which controls the money supply has ultimate control over inflation. If the central bank keeps the money supply stable, the price level remains stable and vice versa (Mankiw, 2004). Keynesians argue that there is trade-off between inflation and unemployment as postulated by the Phillips curve, and policy makers have options for specific combination of inflation and unemployment. Therefore, the effect of changes in money supply is distributed between inflation and output. So Keynes in his theory argued

that the level of income and expenditure are as the main determinates of the price level. Keynes talks about short-run macroeconomics issues under less than full employment situation in an economy. However, in the long run, in a full employment economy, money supply is still considered as the major single determinant of the price level. Therefore, the reason for inflation is a full employment economy (Koirala, 2006). However the monetarist's model of inflation assumes that there is a unidirectional causality from money supply to inflation. There is no long run effect of money supply on output. If the monetary policy affects output and employment, it is only in the short-run transitory effect, not the permanent (Friedman, 1970).

However, the economic growth in Nepal has not been satisfactory and is inadequate for reducing poverty and rising per capita income level. After the two decades of economic liberalization, trade sector has also not performed as expected and export sector has been weakening with growing trade deficit (MoF, 2016). Inflation is a macroeconomic variable that is paid close attention by almost all the countries around the world. Mild inflation is considered to be desirable for economic growth. However, high and variable inflation distorts the smooth functioning of the economy (NRB, 2007). The fundamental objective of monetary policy management in Nepal is the attainment of high and sustainable economic growth accompanied with low level of inflation. As stipulated in the amended Nepal Rastra Bank (NRB) is entrusted with multiple objectives of ensuring price and financial stability and favorable balance of payments for sustainable development of the economy. Accordingly, NRB formulates necessary monetary, foreign exchange and financial sector policies focusing to control inflation, and to maintain financial and external stability. In its annual monetary policy statement, NRB also publishes the projected inflation figure for the coming fiscal year to anchor the inflation expectations at the targeted level. In a mature economy the monetary policy of the central bank plays a big role in determining the level of inflation. If there is excess supply of money in the market and the price of goods and services rises, the bank withdraws liquidity from the market to prevent inflation.

But in an underdeveloped country like Nepal, according to the World Development Report where the informal economy is around 40 percent of GDP, the monetary policies have limited impact on market prices. High and persistent inflation and low economic

growth have been major characteristics of Nepalese economy in the recent years. In the last five years, the average inflationary rate was recorded at 8.8 percent which was higher than the projected inflation by 1.3 percent. Inter-country comparison of inflation in the SAARC countries also shows that Nepal has highest rate of inflation except Bhutan and Pakistan. So, it is necessary to study about the trend, structure and pattern of inflation in Nepal in the present. It is also necessary to examine the major determinants of Inflation in Nepal. Because today's Nepalese economy is not the closed economy (MoF, 2016).

1.2 Statement of the Problem

Inflation which is not only the present issue but also it is being the major issue from the Classical Era to the present Era. Classical and neo-classical economists have shown the validity of quantity theory of money while Keynesian, monetarists and structuralits economists go for structural theory, cost-push theory and others. Thus, it is very important to know the trend, structure and pattern of inflation with its determinants for policy implication as well. Inflation is seen one of the major challenges in the country like Nepal which affects the welfare and the development of the people and the country itself. Nepalese economy has abundant of natural resources as well as geo-graphical diversity. Even though Nepal has huge potentiality of accelerating its economic growth by promoting social welfare, Nepal is only in developing phase. There are many indicators available which shows the economic status of Nepal in the World. Inflation is one of them. In Nepal, inflation reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

In Nepal, rising inflation has been a serious concern to the government. *Nepal being under developed country is facing the problem of inflation. The prevailing inflation rate is 9.5 percent in Nepal (NPC, 2017). Not only developing nation but also the developed nation faces the problem of inflation. IMF has projected that the inflation in developed economies remains 2 percent in 2017.* The growth rate remained low in most of the fiscal year. *GDP has always been in increasing trend. Several controversies have been made regarding the tradeoff between inflation and growth rate.* There exists a large debate in the relationship between

these two macroeconomic variables both theoretically and empirically. *In such situation, the research questions of the study are as below:*

a. *What is the trend and nature of inflation and economic growth in Nepal?*

b. *What is the role of GDP on inflation in Nepal?*

c. *Is there any* causal *relationship between inflation and economic growth rate in Nepal?*

1.3 Objectives of the Study

The general objective of the study is to analyze the relation between inflation and economic growth in Nepal. However, the specific objectives are as given below:

a. To analyze the nature and trend of inflation and economic growth in Nepal.

b. To examine the role of economic growth on inflation in Nepal.

c. To analyze the causal relationship between inflation and economic growth in Nepal.

1.4 Hypothesis of the Study

The hypothesis of the study is that there is a significant role of GDP on inflation in Nepal.

1.5 Significance of the Study

Economic development has been one of the most popular slogans in all developing countries. Similarly, achievement of high rate of economic growth rate, reduction of income inequality, poverty and improvement of living standard of people are some of the development strategies toward which most of the government's efforts have been directed in developing countries. It is known that the government must be able to manage the environment of social welfare by minimizing those factors which creates the disturbances to provide state welfare.

Inflation has become one of the emerging and burning issues in Nepalese economy. It can play significant role in making overall development of the nation. *In recent decades, there has been substantial theoretical and empirical research that investigates the inflation-growth trade off. Those results provided mixed results. So, the study will be helpful to the government, national planner, policy makers, researchers, teachers, students and others who are interested to learn about the relationship between inflation and economic growth.*

1.6 Limitations of the Study

There are few limitations of the study which are listed below:

a. *This study is limited only using the variables like gross domestic product, broad money, foreign trade, capital expenditure and exchange rate for finding the relationship between inflation and economic growth.*

b. *The study analyzes only the secondary data from the fiscal year 1974/75-2016/17.*

1.7 Organization of the Study

The study is divided into five chapters. The first chapter is the introduction which contains background of the study, statement of the problem, objectives of the study, significance of the study, limitations of the study and organization of the study. The second chapter deals with review of literature which includes theoretical review, empirical review including both of international context and Nepalese context and research gap.

The third chapter is the research methodology which contains research design, nature and sources of data, study period covered tools and methods of data collection, data organization and processing, model specification and variable specification, tools and method of data analysis, and hypothesis testing.

The fourth chapter is the presentation and analysis of data which contains trend of inflation and GDP, role of economic growth on inflation, correlation matrix, regression analysis and granger causality test. The last chapter, the fifth chapter is the major findings, conclusion and recommendations.

CHAPTER - II
REVIEW OF LITERATURE

A literature review is a search and evaluation of the available literature in the given subject and study area. It shows the readers that the study has an in-depth grasp of the subject. It demonstrates a familiarity with a body of knowledge and establishes the credibility of the work. It summarizes prior study how the study is linked to it, integrated and summarized about the subject matter. Similarly, it also demonstrates that the researcher has learnt from others and this research is a starting point for new ideas. A variety of theoretical and empirical literature exists on the relation between inflation and economic growth, based on different techniques and time periods. The chapter attempts to review different theories and empirical studies relating to inflation and economic growth that helps to understand and identify the determinants of inflation. The chapter consists of theoretical review, empirical review including both of international and national context and research gap.

2.1 Theoretical Review

There are many theories on inflation and economic growth and relationship between them. Classical economists advocated for 'Laissez-faire' and proclaimed the idea of free market where the profit motive was the main cause of economic growth. Some economists believes on moderate level of government intervention is needed to track the economy smoothly. Keynesian economists asserted that free markets have no self-balancing mechanisms to lead full employment. They criticized the classical economists believes of long run by saying that "we are all dead in the long run". And put forward the idea of 'government intervention' to short term cure. As such, there were different theories forwarded by different economists in different period. The brief explanations of these theories are below.

a. ***Classical Approach:*** Classical economists believe on 'Laissez-faire' economy. They argued for the idea of free market where the profit motive is main cause of economic

growth. *Classical economist assume the economy is always tends to full employment in the long run. Market play role of economic stabilization. The classical quantity theory of money shows the inflation is monetary phenomenon, which is directly and proportionately related to money supply* (Gokal & Harfi, 2004). *The equation of classical quantity theory of money is as shown below.*

$MV = PT$ ----------------------------- (1)

Where, M is total quantity of money, V is velocity of money, P is general price level and T is total volume of transaction. And classical economist assumes that V and T are constant as economy is in full employment. Hence price level (inflation) is directly and proportionately related to quantity of money supply.

b. ***Neo-classical Approach:*** Neo-classical economists Solow and Swan (1956) contributed on growth theory, and concluded that labour, capital and technological advancement are the main determinants of long run economic growth. The capital level will move to and stabilize at the steady state on which output will keep constant at given exogenous variables. Once this balance is broken by change of exogenous variables, new steady state will be achieved (Xiao, 2009). Regarding the inflation, neo classical economist also believes that inflation is directly related to money supply like classical thought. But, the neo classical quantity theory of money assumes that money is not only demanded for transaction motive but also for store in value. It means beyond the transaction motive people demanded certain proportion of money to hold in cash. i.e.,

$M = kPY$ …………………………(2)

Where M is Money supply, P is price level, Y is total volume of real transaction and k is certain constant proportion of PY.

c. ***Keynesian Approach:*** The Keynesian apply the Aggregate Demand (AD) and Aggregate Supply (AS) to illustrate the output inflation relationship. According to this model, in the short-run, the AS curve is upward sloping which implies that stimulating the demand side of the economy affect both prices and output. Based on this concept, Keynesians advocate a positive relationship between inflation and output (Fabayo & Ajilore, 2006). The initial short- run trade-off between inflation and output results from the time inconsistent problem until it lures the producers into more output. However, in

the long-run, the AS curve becomes vertical. The policy implication of vertical AS curve is that demand side policy is no longer increase the level of output but only the level of price. Keynes argued that inflation is the caused by increase in the aggregate demand. According to Keynes, the aggregate demand might increase due to increase in real factors like increase in demand of goods and services, increase in government expenditure, and so on. So, Keynes in his theory argued that the level of income and expenditure are as the main determinates of the price level (Ball & Doyle, 1969).

d. **Monetarist Approach:** *Monetarism has several essential features, with its focus on the long-run supply-side properties of the economy as opposed to short-run dynamics. Friedman (1970) coined the term 'Monetarism', emphasized several key long-run properties of the economy, including the quantity theory of money and the neutrality of money. The quantity theory of money linked inflation and economic growth by simply equating the total amount of spending in the economy to the total amount of money in existence. Friedman proposed that inflation was the product of an increase in the supply or velocity of money at a rate greater than the rate of growth in the economy.* Monetarism suggests that in the long-run, prices are mainly affected by the growth rate in money, while having no real effect on growth. If the growth in the money supply is higher than the economic growth rate, inflation will result (Gokal & Harfi, 2004).

e. **Neo-Keynesian Approach:** On the other side, neo-Keynesian economists developed the concept of potential output also known as natural output and argued that inflation is determined by the actual level of output and level of unemployment. If the actual level of output is higher than its potential level and unemployment is below the natural rate, inflation accelerated that causes to shift in Philips curve to outward indicating higher inflation with higher unemployment (Gordon, 1997). *However, one problem with this theory is that, the exact level of potential output and natural rate of unemployment is generally unknown and tends to change over time. Inflation also seems to act in an asymmetric built-in inflation is often linked to the price/wage spiral because it involves workers trying to keep their wages up*

with prices and then employers passing higher costs on to consumers as higher prices as part of a vicious circle (Gokal & Harfi, 2004).

f. ***Modern Approach:*** The **modern theories of inflation** follow the theory of price determination. This means the general price level can be determined by aggregate demand and aggregate supply of goods and services. The variations in the general price level are caused by a shift in the aggregate demand and aggregate supply curves. The modern theories of inflation are in fact the blend of classical and Keynesian theories of inflation. The classical theory laid emphasis on the role of money, i.e., the price rises in proportion to the supply of money, and ignored the non-monetary factors affecting inflation. While, the Keynesian theory laid emphasis on the non-monetary factors, i.e. aggregate demand in the real terms and ignored the effect of monetary expansion (money supply) on the price level. The modern theories of inflation show that the price level is influenced by one or both of the demand-side and the supply-side factors. The factors which are functional on the demand side are called as the demand-pull factors, and those who operate on the supply-side factors are called as cost-push factors (Dwivedi, 2010).

2.2 Empirical Review

Empirical review is divided into two parts like international context and Nepalese context.

2.2.1 International Context

Bruno and Easterly (1995) investigated on determinants of economic growth of 26 countries that encountered a high level of inflation rate during certain time frames, i.e. (1961-1992). Based on their study, an inflation rate that was over 40 percent is considered as an inflation crisis. They find inconsistent or somewhat inconclusive relationship between inflation and economic growth below this threshold level when countries with high inflation crises are excluded from the sample. In addition, the empirical analysis suggested that there exists a temporal negative relationship between inflation and economic growth beyond this threshold level. The robustness of the empirical results is examined by controlling for other factors like terms of trade shocks, political crises, and wars. The study concluded that a reduction in the inflation rate would

be helpful to an economy in order to recover from inflation crisis. So, the study concluded that a high inflation rate does not necessarily damage the economy. Finally, they found that countries recover their pre-crisis economic growth rates following successful reduction of high inflation and there is no permanent damage to economic growth due to discrete high inflation crises.

Barro (1995) analyzed that the estimated effects of inflation on growth and investment are significantly negative when some plausible instruments are used in the statistical procedures. The researcher conducted a study based of more than 100 sample data economies for the year 1960 to 1990. The study revealed that there was a negative correlation between growth and inflation. There is some reason to believe that the relations reflect causation from higher long-term inflation to reduced growth and investment. *A further estimation showed that the impact effects from an increase in average inflation by 10 percent points per year are a decrease in the ratio of investment to GDP by 0.4 to 0.6 percentage points and a reduction of real per capita GDP by 0.2 to 0.3 percent points per year. This shows that* there is a negative correlation between economic growth and inflation.

Dotsey and Sarte (2000) studied the effects of inflation variability on economic growth for the US economy. They used the neo-classical endogenous growth model with money included as an explanatory variable. The findings of the authors show that higher average inflation has a negative impact on the steady state growth. This is because of the higher cost of transaction that inflation causes to the money market. On the other hand, the authors argue that inflation has a positive impact on growth in the short-run through precautionary savings. During inflation volatility, precautionary savings rise and that is positively related to growth and negatively related to welfare. In the overall finding, the negative effect of inflation outweighs the positive impact of inflation, thereby supporting the view that higher inflation has a negative impact on growth.

Malik and Chowdhury (2001) examined that whether a relationship exists between economic growth and inflation and, if so, its nature. The study used cointegration and error correction models to empirically examine long-run and short-run dynamics of the inflation-economic growth relationship for four South Asian countries using annual data.

In addition to significant feedbacks between inflation and economic growth, the authors found two interesting results. First, inflation and economic growth are positively related. Second, the sensitivity of inflation to changes in growth rates is larger than that of growth to changes in inflation rates. These findings have important policy implications. Contrary to the policy advice of the international lending agencies, attempts to reduce inflation to a very low level (or zero) are likely to adversely affect economic growth. However, attempts to achieve faster economic growth may overheat the economy to the extent that the inflation rate becomes unstable. Thus, these economies are on a knife-edge. The challenge for them is to find a growth rate which is consistent with a stable inflation rate, rather than beat inflation first to take them to a path of faster economic growth. They need inflation for growth, but too fast a growth rate may accelerate the inflation rate and take them downhill.

Boyd et al., (2001) examined the impact of inflation on economic growth by incorporating variables such as trading volume, stock market capitalization, bank liabilities, domestic credit to the private sector. The study undertook a cross sectional study based on time series data from 1960-1995. *In addition, they found that the relationship between inflation and financial development is nonlinear. The adverse effects of inflation on growth become 'Flatter' as inflation increases up to a critical level.*

Gokal and Hanif (2004) have analyzed the relationship between inflation and economic growth in Fiji. The study focuses on causal relationship between the two variables in the country. They used annual observation of 34 years (1970-2003) for variables of Real GDP, annual average CPI, and year on year CPI inflation rate. To test the causal relationship 'Granger Causality Test' is applied but before that the authors have examined the time series properties of the data using Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests and the variables are found to be integrated of order. The findings of the analysis reveal that both inflation measures (annual average CPI and year on year CPI) have negative weak relationship with the GDP growth. The finding of the Granger causality test indicates that causality runs one way from economic growth to inflation. The study concluded that inflation in Fiji is highly influenced by international

factors and there is a weak and negative relationship between inflation and economic growth. They further recommend that Fiji's monetary policy must aim to reduce inflation and inflation expectations to promote economic growth.

Hodge (2005) found that inflation has negative long-run impact on the economic growth in South Africa. The study also examines the level of growth sacrificed in the short-run to achieve lower inflation. To attain the results of the study annual time series data for the period of 1950-2002 is used. A growth equation is used with explanatory variables of CPI, labour productivity, investment, tax on income and wealth, and terms of trade to see the long-run relationship between the two variables. OLS regression results have shown that there is a strong and statistically significant negative long-run relationship between inflation and economic growth in South Africa. To see the shortrun relationship between the two variables, an inflation equation explained by lagged inflation, lagged GDP growth rate, lagged change in labour cost and change in import prices is used. The finding shows that there has to be accelerating inflation in order to achieve growth in the shortrun. Hence, inflation targeting has to be ignored to achieve short-term growth. But in the longrun the two variables have a negative relationship and thus an increase in inflation to achieve short-term growth will have higher cost in the long-run.

Ahmed and Mortaza (2005) explored the present relationship between inflation and economic growth in the context of Bangladesh. Using annual data set on real GDP and CPI for the period of 1980 to 2005, an assessment of empirical evidence has been acquired through the co-integration and error correction models. Further, it explores an interesting policy issue of what is the threshold level of inflation for the economy. The empirical evidence demonstrates that there exists a statistically significant long-run negative relationship between inflation and economic growth for the country as indicated by a statistically significant long-run negative relationship between CPI and real GDP. In addition, the estimated threshold model suggests 6 percent as the threshold level (i.e., structural break point) of inflation above which inflation adversely affects economic growth. These results have important policy implications for both domestic policy makers and the development partners working for the country.

Boyd and Champ (2006) have explained how high inflation affects economic growth through financial intermediaries. Their analysis starts with the theoretical insight that states inflation reduces the real return on assets. This is through discouraging saving and encouraging borrowing which raises nominal interest rate. A rise in the nominal interest rate in turn discourages investment and hence growth. Based on this the authors tested two testable hypotheses from the theoretical literature. They found that a high inflation reduces the amount of money that banks lend. The study has concluded that inflation has a negative effect on economic growth. They have also noted the necessity of finding the critical point where inflation becomes harmful.

Vsalian and Gopakumar (2008) examined the relationship between inflation and GDP growth in India. It is obtained from the co-integration and error correction models using annual data of 1972/73 to 2007/08 collected from Reserve Bank of India. They found that there is a long-run negative relationship between inflation and GDP growth rate in India. They also found that inflation is harmful rather than helpful to growth with the help of both models and also it is possible to examine the short-run and long-run relationship between two variables. The Engle-Granger two step co-integration procedure is used to test the presence of co-integration between the two variables. The sensitivity of inflation to change in growth rates is higher than that of growth to change in inflation rates. Their important conclusion is that any increase in inflation from the previous period negatively affects growth.

Geda and Tafere (2008) have analyzed the forces behind the recent inflationary pressure in Ethiopia. Quarterly data for the period 1994/05-2007/08 is used. In the formulation of the VAR model explanatory variables for the Ethiopian inflationary process are exchange rate, world price index, world non-food prices, real income, excess money supply, food imports, food aid, marketed surplus, unit wage costs and the exogenously administered prices. In order to avoid spurious regressions, unit root tests were conducted and all variables are found to be stationary at the first order that allows undertaking the VAR based co-integration test. After the cointegration vectors are identified for the models of food and non-food inflation, a single error correction model is estimated for both models. Among the explanatory variables of inflation income growth is the relevant variable in our case. They recommend that policy makers cool down economic growth through fiscal

and monetary conservatism. Since the main source of the recent inflation in the country is food inflation, an increase in income is found to be the major determinant of food inflation. Hence, it can be concluded that there is a negative relationship between inflation and economic growth in Ethiopia.

Xiao (2009) revealed the nature of inflation and economic growth relationship of China from 1978 to 2007. The study rest upon correlation matrix, granger causality test and co-integration and error correction models to reveal the nature of relationships both between inflation and economic growth. Correlation coefficients and granger causality test tell that inflation both relate to economic growth and capital accumulation and the causal direction of both of the two relationships is two-way. However, in the analysis of co-integration and error correction models, results show that only inflation and economic grow has the long-run positive equilibrium relationship. The long-run positive bi-direction causal relationship between inflation and economic growth show that China should control the level of inflation as the high speed development of economy. On the other hand, it should be noted that economic growth would be slowed when stabilizing the price level by lowering CPI.

Hasanov (2010) examined the effects on inflation on economic growth in Azerbaijan by utilizing annual time series data from the period 2001-2009. The study incorporated gross fixed capital formation as an additional variable and the results showed strong evidenced that the linkage between economic growth and inflation was associated with threshold effects. Threshold results further revealed that the association between economic growth and inflation is non-linear and positive effects of inflation on economic growth were observed at levels below 13 percent. At levels beyond 13 percent the relationship between economic growth and inflation tends to be significantly positive. Thus, increases in the inflation rate to levels beyond 13 percent were presumed to restrict economic growth by 3 percent. This was reinforced by Umaru and Zubairu, 2012 who established that economic growth granger causes inflation but inflation does not granger cause economic growth and at low levels of inflation, increases inflation have a stimulus response on economic growth.

Gillman and Harris (2010) investigated the effect of inflation on economic growth for countries under transition. The study is undertaken by using a panel data evidence for 13 transition countries over the period 1990-2003. The data is obtained from World Bank Development Indicator (WBDI). The estimation process has three equation systems namely the growth, inflation and money demand equations. The maximum likelihood estimation technique using full information is applied. The results obtained from the study are similar to the findings for the OECD countries that there exists strong negative relationship between growth and inflation. This confirms that the growth in the region is similar to that of developed countries implying the convergence of growth. The authors thus suggest monetary policies to be inflation targeting and fiscal policies to keep budget deficits within acceptable range.

Hussain (2011) has explored the nexus between inflation and economic growth in the context of Pakistan economy. Annual data for the period of 1960-2006 has been used. According to the results of the study, inflation is positively related with economic growth in Pakistan and vice versa. As for as, the concern of causality between these two variables, it is found to be uni-directed. In other words, inflation is causing growth but not vice versa. A judgment of the empirical evidence has been obtained through the co-integration and error correction models to examine the long-run and short-run dynamics of the inflation-growth relationship. In addition, the study also discovers an interesting policy issue of what is the threshold level of inflation for the economy. The empirical evidence suggested that there was positive relation between inflation and economic growth in Pakistan. Furthermore, the estimated threshold model suggests that 9 percent threshold level of inflation above which inflation starts to lower the economic growth in Pakistan. The results of the study also suggested that below the estimated level of 9 percent is conducive for economic growth in Pakistan. The study concluded that inflation-growth relationship is positive and above 9 percent level of inflation. These findings have some policy implications for the policy makers and development partners. This study is inconsistent with policy suggestions by international agencies. Efforts to minimize inflation to a very low level (or zero) are likely to adversely affect economic growth. However, attempts to achieve faster economic growth may overheat the economy to the extent that the inflation rate becomes unstable.

Adeyeye and Kola (2012) examined the causes and effects of inflation in Nigeria between 1969 and 2009 by using the time series data of that period. Both analytical and descriptive methodology were employed to investigate the effect of money supply, real gross domestic product, ex-change rate and budget deficit on Nigerian inflation. They have used log linear multiple regression model to find out the effect of given variables in Nigerian inflation. ADF test is employed to check the stationary of the data from 1969 to 2009. They found that there is a negative relationship between inflation and GDP growth rate.

Salian and Gopakumar (2012) have studied the relationship between inflation and growth in the short-run and in the long-run for the Indian economy. Annual data for the period 1972-2007 obtained from Reserve Bank of India is used to execute the research. To see the long-run relationship, the two step co-integration procedure is used and an error correction model is employed to see the short-run dynamics between the two variables under study. In this study, inflation and growth are negatively related. The study also found that inflation is more sensitive to changes in the economic growth while growth is less sensitive to the changes in inflation. These authors then concluded that higher inflation from the previous year is harmful to the economic growth. Thus, no matter what the threshold level is, policy makers must pressure inflation downwards.

Kasidi (2013) examined the impact of inflation on economic growth and established the existence of inflation growth relationship *as* there has been substantial debate on whether inflation promotes or harms economic growth. The study *used time series data for the period 1990-2011*. The results from regression analysis revealed that inflation has the negative impact on economic growth of Tanzania. This indicated that inflation is harmful to economic growth of Tanzania. Correlation coefficient and co-integration technique were employed to establish the relationship between inflation and GDP. The results of co-integration showed that there was no co-integrating relationship between inflation and economic growth over the period of 1990-2011. That is no any statistically significant long-run relationship between inflation and economic growth in Tanzania. Only a negative and statistically significant short term relationship was found. These results are consistent with other previous studies. Moreover, the study found that the degree of responsiveness of GDP to changes in the general price levels is large. The study

concluded that the degree of responsiveness of change in GDP as a result of change in the general price levels is inelastic.

Anochiwa and Maduka (2015) have analyzed the relationship between inflation and economic growth in Nigeria. The methodology employed is the Johansen-Juselius cointegration technique and Granger Causality Test. The variables are the rate of Inflation and the GDP as a perfect proxy for economic growth to examine the relationship. The scope of the study spanned from 1970 to 2012. The test showed that for the periods, 1970-2012, there was a co-integrating relationship between Inflation and economic growth for Nigeria data. Thus, the study could find a long-run relationship between Inflation and economic growth for Nigeria. The relationship between inflation and growth is non-linear. The study suggested that there is adverse effect of inflation on economic growth but that may not be universal. It appears only when inflation exceeds some turning-point or threshold level below which inflation has a positive or non-significant impact on economic growth. Notwithstanding, the result equally show that inflation does not promote economic growth because as the coefficient of inflation is negative, it implies that any percentage increase in inflation will bring equal or more percentage decrease in economic growth. This result is related to the Granger causality test. What this result indicates is inflation has a negative impact on growth.

Ihugba, Ebomuche and Ezeonye (2015) analyzed the link between inflation and economic growth using co integration and error correction models to empirically examine long-run and short-run dynamics for Nigeria using annual data from 1970-2013. The paper concluded that inflation and economic growth are positively related and that increase in inflation rate does not reduce economic growth which implies that the rising cost of goods and services is not as a result of increase in real gross domestic product. Economic growth and inflation have both short-run and long-run relationships based on the empirical findings. The relationship between economic growth and inflation is inelastic i.e. a change in economic growth results to a lesser change in inflation. The average inflation rate from 1970-2013 was 19.2% and this should affect economic growth negatively but the study proves otherwise which still boils down on the cost of production been the major propeller of the rising cost of goods and services in the country.

2.2.2 Nepalese Context

NRB (2007) suggested that inflation in Nepal is mainly determined by Indian inflation with narrow money only having an effect in the short run (less than one year). The study attributed this result to the geographical situation of having a shared open and contiguous border, which facilitates informal trade and goods arbitrage, a rigid pegged exchange rate regime between both currencies along with time varying capital mobility: i.e. it is less mobile in the short term (less than one year) but being more so in the long term. The study had therefore concluded that within the existing framework of pegged exchange rate and capital mobility, the main influencing factor of inflation is from India with the NRB having control over domestic inflation only in the short run (a one year window) but limited control beyond that. The above results are similar with other studies like IMF (1993) and Thapa (2004).

Bhusal and Silpakar (2011) estimated threshold level of inflation in Nepal using annual data for the period 1975-2010. The threshold value of inflation is found to be 6% for Nepal. Beyond that level of inflationary rate, higher or lower than the threshold value, the economic growth can be jeopardized. Looking specifically at Nepal's economic and inflation performance, the less than robust link between the two variables is not surprising, given the current structure of the economy and factors which influence inflation. The study reveals the positive relationship between the inflation and the economic growth that are one way related to each other, there is one way causal relationship from inflation to economic growth but not from economic growth to inflation.

Paudyal (2014) examined the short term and long term effects of the macroeconomic variables on the inflation in Nepal during 1975-2011. The variables considered are real GDP, budget deficits, Indian prices, broad money supply, and exchange rate. The regression results from Wickens-Breusch Single Equation Error Correction model suggested that all variables considered are significant in long run. This empirical study suggested that prices in Nepal became highly dependent on Indian prices especially after 1991's political change. It is because of a weaker supply of domestic production supplemented by the increased imported goods from India. The movement of Nepali

prices is very close to Indian prices after 1991/92. Besides, some of the domestic products could not compete with Indian goods in domestic market in the changing context of reduced import duties under preferential trade agreement with India. This led further rise in the imports from Indian goods and thereby the influence of Indian prices in Nepali prices. So, this has obviously increased the dominance of Indian prices in the domestic prices in the later years.

NRB (2017) estimated the optimal inflation rate in Nepal based on the data of the period 1978–2016. The novelty of the analysis is that it probes possible nonlinearity of the hypothesized impact of inflation on economic growth using alternative specifications. The results suggested that there exists a threshold effect of inflation. The 'Ordinary Least Squares' method estimates the turning point of inflation to be 6.25 percent while that of the Hansen (2000) method shows the threshold level to be 6.40 percent. The maximum impact on growth associated with the turning point and at the mean levels of other explanatory variables is quite high at 4.59 percent. The results suggest that Nepal should adopt an inflation target range around the computed optimal inflation rate to lower the inflation expectation and enhance economic growth.

Chaudhary and Xiumin (2018) examined the impacts of macroeconomic variables on the inflation in Nepal during 1975-2016. The variables considered for the study is limited to the use of real GDP, broad money supply, and Indian prices. The results suggested that all variables considered are significant in long run implying that these variables are the determinants of inflation in Nepal. The main aim of this paper was to establish the relationship between inflation, real GDP, money supply, and imported price (CPI of India) by reviewing relevant studies using Nepal as the reference country. It is clear that the growth rate of real GDP, money supply, and imported price are the main determinants of inflation in Nepal. This study suggested that prices in Nepal are highly dependent on Indian prices because of a weaker supply of domestic production supplemented by the increased imported goods from India.

2.3 Research Gap

The study has attempted to cover the gap of previous studies in terms of sample size and research methodology. Thus, the study is different from earlier studies of Nepalese

context. The study can be helpful from its contribution to fill the gap between the previous studies and also the finding of this study can add value to the existing body of the literature.

CHAPTER - III

RESEARCH METHODOLOGY

Research is a logical and systematic search for new and useful information on a particular study area whereas research methodology is the specific procedures or techniques used to identify, select, process, and analyze information about a topic. In a research paper, the methodology section allows the reader to critically evaluate a study's overall validity and reliability. The chapter deals with the methodological procedure adopted in the study.

3.1 Research Design

The study is belonging to explanatory type using both of descriptive and analytical research based on secondary sources of data. Deductive method is used. Descriptive analysis is carried out to analyse the nature and trend of inflation and economic growth. However, econometric model is used to find the impact of GDP on inflation through a deductive method and also to analyze the causal relationship between inflation and economic growth in Nepal.

3.2 Nature and Sources of Data

This study is fully based on secondary data and information. The required data and information is collected from various publications of NRB, MoF, NPC, and website of the World Bank.

3.3 Study Period Covered

The study covered 43 years of data from fiscal year 1974/75 to 2016/17. The reason to select this period is for the consistency of the availability of all concerned variables. Also it covers long series of data which is quite sufficient for the reliability and validity of the result of trend analysis and results obtained from the econometric model.

3.4 Tools and Method of Data Collection

First of all the, the raw information was collected from the different websites, visiting concerned offices, institutions and libraries. More specifically, the nominal data is collected from the website of NRB, and website of the World Bank.

3.5 Data Organization and Processing

After collection of raw data and information that were converted into real term considering fiscal year 2000/01 as a base year. The reason behind the taking fiscal year 2000/01 as a base year is that it was a normal year and the GoN also takes this year as base year. For analysis of the first objective i.e., the trend and nature of inflation and economic growth in Nepal, simply the figures are drawn in terms rupees and percentage. But the study of second and third objective are based on econometric analysis which required the data (time series) must be stationary hence the data are converted into logarithm form. The Microsoft Excel software is used for drawn the figures for trend and nature of inflation and economic growth, and E-view (the statistical software) is used to analyse the impact of GDP on inflation and find the relationship between inflation and economic growth in Nepal. The Augmented Dickey Fuller (ADF) Unit Root Test is done for checking the stationary of time series data.

3.6 Model Specification

In order to find the role of economic growth on inflation in Nepal, the following multiple regression model is used:

$$\ln NCPI = \alpha + \beta_1 \ln RGDP + \beta_2 \ln RM_2 + \beta_3 \ln ICPI + \beta_4 \ln RGCE + \beta_5 \ln EXR + \beta_6 \ln RFT + e_i$$
…………….. (1)

Where,

NCPI= National Consumer Price Index of Nepal

RGDP = Real Gross Domestic Product

RM_2 = Real Broad Money Supply

ICPI = Indian Consumer Price Index

RGCE= Real Government Capital Expenditure

EXR = Exchange Rate

RFT = Real Foreign Trade

$\alpha, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_6 are constant and coefficients, and e_i is stochastic error term. All the variables are expressed in logarithmic term so that the regression coefficients directly express the elasticity of the dependent variable with the explanatory variables.

Similarly, to examine the causality between inflation and GDP growth, following pair wise Granger Causality model has been used (Gujarati, 2004).

$$RGDPG_t = \sum_{i=1}^{n} \alpha_i I_{t-i} + \sum_{j=i}^{n} \beta_j RGDPG_{t-j} + u_{1t} \quad \ldots\ldots\ldots\ldots(1)$$

$$I_t = \sum_{i=1}^{n} \gamma_i I_{t-i} + \sum_{j=i}^{n} \delta_j RGDPG_{t-j} + u_{2t} \ldots\ldots\ldots\ldots.. (2)$$

Where, I = Inflation,

RGDPG = Real Total Gross Domestic Product Growth

α, β, γ and δ = Parameters,

u = Error term, and

t = fiscal year

3.7 Specification of Variables

The study attempts to analyze the factors determinations of inflation in Nepal by using various econometric and statistical tools in which the following variables are used.

a. National Consumer Price Index (NCPI): The NCPI is a statistical estimate constructed using the prices of a sample of representative items whose prices are collected periodically. In this study, inflation in Nepal (NCPI) is taken as a dependent variable in which log of consumer price index is used as the dependent variable to examine the its relations with others explanatory variables.

b. Real Gross Domestic Product (RGDP):- The real gross domestic product is the inflation adjusted money value of all final goods and services which are produced within in the country during a year. It is expressed in base-year prices, and is often

referred to as 'constant price'. Here, the real GDP of Nepal is expressed as independent variable in the regression model. The real GDP at producer prices are collected from different publication of 'Economic Survey' of Nepal. The growth rate of real GDP shall be considered as economic growth in this paper. It is the core independent variable of the study.

c. Real Broad Money Supply (RM$_2$): It is the broad definition of money supply which is associated with the modern economist Friedman (1970) and his followers. Broad money supply is the sum of currency held by people in their hands/pockets and both demand deposit (DD) and time deposit of people with the banking institutions.

i.e. M_2= C + DD + TD. It is the first counter variable of the regression model.

d. Indian Consumer Price Index (ICPI): It measures changes in the price of market basket of goods and services of the consumers. Like that, Indian consumer price index also measures change in the prices of the market basket of goods and services of the consumer in India. It is the second counter variable of the regression model.

e. Real Government Capital Expenditure (RGCE): Government expenditure consists of the purchase of goods and services by the government which includes public consumption and public investment, and transfer payments consisting of income transfer (pensions, social benefits) and capital transfer. It is also taken as independent variables in the regression model. Only capital expenditure is taken into consideration. It is the third counter variable of the regression model.

f. Exchange Rate (EXR): Exchange rate is a value of home currency that has compared to foreign currency. Generally, Exchange rate is divided into two categories, namely, fixed exchange rate and flexible exchange rate. Fixed exchange rate is determined by the central bank whereas flexible exchange rate is determined by the demand and supply of the foreign currency in the market. It is also considered as independent variable in the model. It is the fourth counter independent variable of the study.

g. Real Foreign Trade (RFT): Foreign trade includes total imports as well as total export of goods and services by residents (includes citizens, business and the

government) of a country. It is also considered as independent variable in the model. It is the fifth counter variable of the regression model.

3.8 Tools and Method of Data Analysis

To analyze the trend and nature of inflation and economic growth in Nepal, descriptive method is used such as table, graph, percentage, which is drawn by using Microsoft Excel software. To find the causal relationship between inflation and economic growth in Nepal, the Ginger Causality test is done. Similarly, to examine the impact of inflation on economic growth in Nepal, multiple regression model is used; for drawing these results e-views10 software is used and to find the causes of inflation descriptive method is used.

3.9 Hypothesis Testing

Hypothesis testing is a way to test the results of a survey or study to see if it has meaningful results. In general, hypothesis is defined as an assumption or statement made about the population parameter. Since these assumptions may or may not be valid, the hypothesis testing is done to confirm it. There are two types of hypothesis, namely, null hypothesis and alternative hypothesis. The null hypothesis is the hypothesis to be tested and it is referred as hypothesis of no difference. There are several techniques of hypothesis testing. However this study has used t- test and F-test for the testing of the hypothesis. The formula for t- test is:

$$t = \frac{\chi - \mu}{\sqrt{(s^2)/(n-1)}} \ldots\ldots\ldots\ldots \text{(Gujarati, 2004)}$$

Likewise, Testing the Overall Significance of a Multiple Regression: F-Test

To test the overall significance of a multiple regression, null hypothesis that of all coefficients are jointly zero. This joint hypothesis can be tested by the analysis of variance (ANOVA) technique. Given the K variables in the models:

$Y_i = \beta_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_k X_k + u_i$ ……………………………. (1)

Null Hypothesis: All coefficients are simultaneously zero (i.e., $\beta_1 = \beta_2 = \beta_3 = \ldots = \beta_k = 0$).

And F test is computed by:

$$F = \frac{ESS/DF}{RSS/DF} = \frac{ESS/(k-1)}{RSS/(n-k)} \ldots\ldots\ldots\ldots \text{(Gujarati, 2004)}$$

If $F > F_\alpha$ (k-1, n-k) reject null hypothesis; otherwise not. Where, F_α (k-1, n-k) is critical value of F at α level of significance. Alternatively, if the p-value of F is sufficiently low, we can reject hypothesis. It means that all coefficients are not simultaneously zero or the multiple regressions are significance.

CHAPTER - IV

PRESENTATION AND ANALYSIS OF DATA

The chapter is the body part of the study which is divided into three sections as per the given objectives. The first section provides the data analysis related to the first objective of the study. It means that the first section of this chapter deals about the trend, nature of the inflation and economic growth in Nepal during the study period. Similarly, the second section provides the key information about the second objectives in which this section deals about the role of GDP on inflation in Nepal during the study period. Likewise, the third section deals with the third objective i.e. causal relation between GDP and inflation.

4.1 Nature and Trend of Inflation and Economic Growth in Nepal

The nature and trend of inflation and economic growth in Nepal is shown graphically as well as in the table below. Also decade wise inflation and economic growth is shown with its overall average during the decade.

4.1.1 Year-wise National Consumer Price Index in Nepal

The NCPI index captures the average household's consumption basket that is determined through National level HBS survey. It is known that the measurement of inflation in Nepal was started form the year of 1973 by using the expenditure weight of the goods and services of the people obtained from the first household budget survey (1972/73). The trend of NCPI inflation in Nepalese economy from the time period 1974 to 2016 is shown in Figure 4.1. And data are shown in the Appendix - I.
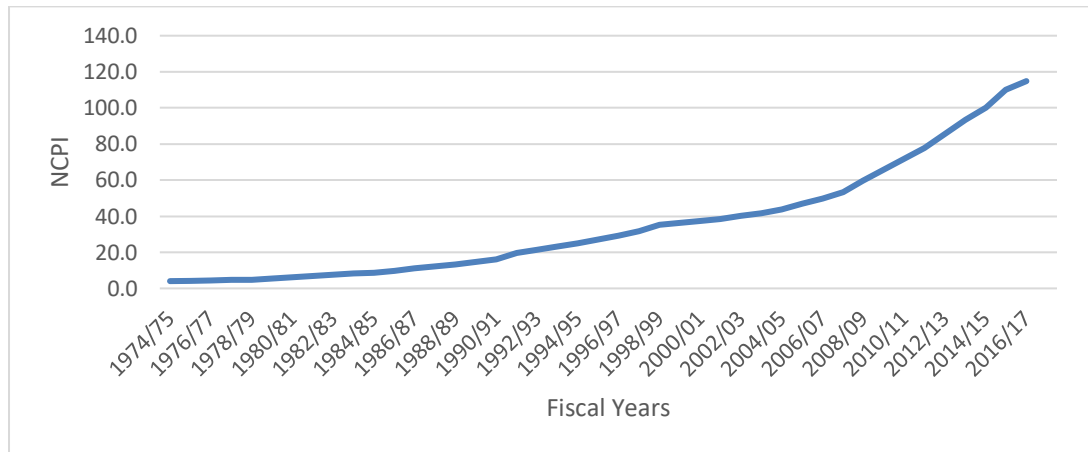
Figure 4.1 shows the increasing trend of NCPI in Nepal from the year 1974 to 2016. In the above figure Y-axis measures the value of NCPI and X- axis measures the fiscal year. NCPI is seemed to be highest in the year 2016/17 and lowest in the year 1975/76. The average NCPI is recorded to be 95.01 over the period of 43 years.

4.1.2 Inflation Rate of Nepal

Inflation rate is recorded to be 4.4 in the year 2016/17. This shows that the inflation is in decreasing trend as compared to previous fiscal year.

Figure 4.2: Trend of Inflation
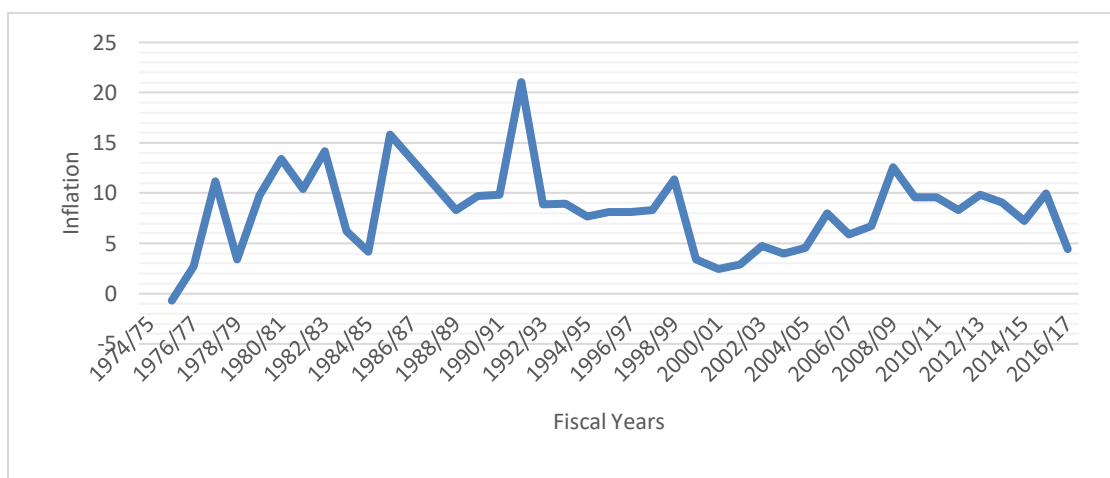
Source: Appendix – II.

Figure 4.2 shows that the inflation decreased to negative in 1974/75 around at 0.69 percent. Then it has increased to double digit in the decade of 1980s. However it declined at a single digit in 1984/85 and again it has increased in the years 1986, 1987, 1988 with double digit then it became in single digit until 1990. Again, the inflation rate grew at double digit in 1991 at 21.1 which was the highest inflation rate during the study period. But it declined at 2.4 in 2000/01 which was the lowest inflation rate during the study period. So, generally, the rate of inflation over the study period (1975-2016) is seen highly fluctuating up to the period 1992 in nature and then it is seen moderate fluctuating after the period 1993. Even though the pattern of inflation in Nepal is volatile in nature, it is hovered around the 5 to 10 percent in most of the study period. The average inflation rate has been recorded at 8.3 percent during the period of 43 years. The data of inflation rate is shown in Appendix-II.

4.1.3 Decade-wise Average NCPI and Inflationary Rate

Following table shows the decade wise analysis of national consumer price index and inflationary rate of Nepal.

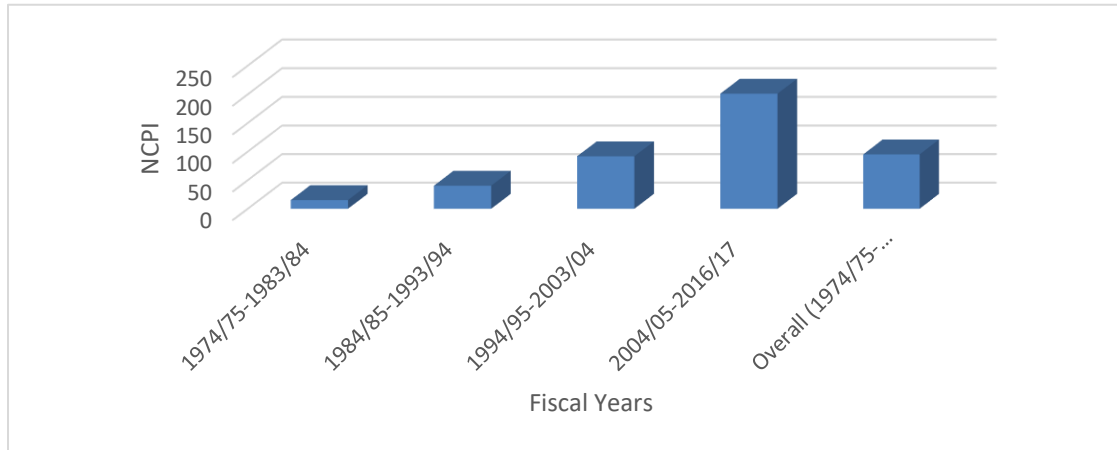**Table 4.1: Decade-wise Average NCPI and Inflationary Rate**

Fiscal Years	National Consumer Price Index	Inflation
1974/75-1983/84	15.11622	7.845091
1984/85-1993/94	40.30065	11.07458

1994/95-2003/04	91.74492	6.101774
2004/05-2016/17	201.0733	8.127683
Overall Average	95.01327	8.28641

Source: Author's Calculation from Appendix – II.

Table 4.1 shows the decade wise average national consumer price index and inflation. In the above table we can see that NCPI is low at the first decade but as time passes by, the second decade shows the increasing trend. Similarly in third decade the NCPI keeps increasing and become more than double than previous decade. Likewise in fourth decade also the NCPI increases and becomes more than double. The overall average of NCPI is seemed to be 95.01. However the inflation is also in increasing trend and reached to double digit in second decade but in the third decade it is seen decreased slightly and is maintained to 8.12 on an average. And the overall average of inflation is recorded as 8.28. The Table 4.1is shown in figure below:
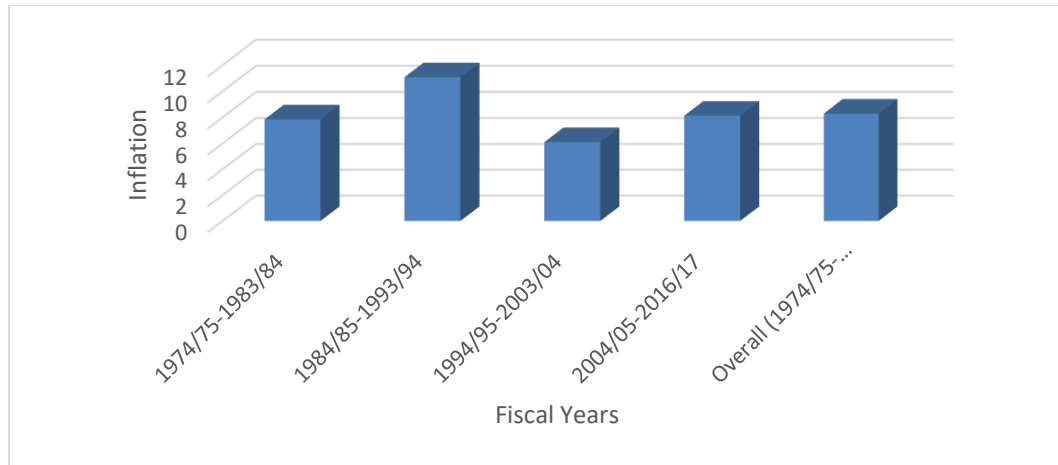
Figure 4.3.: Decade-wise Average NCPI

Source: Based on Table 4.1

Figure 4.3 shows decade wise average of NCPI which is in the increasing trend and the overall average of NCPI are 95.01. Lowest average is recorded in the first decade whereas highest average NCPI is recorded in last decade.

Figure 4.4: Decade - wise Average Inflation

The figure 4.4 shows the decade wise average of Inflation, which shows that the inflation is in increasing trend till second decade and after the end of second decade it is seen that inflation slightly decreases from double digit to single digit and again increased a little bit in fourth decade to 8.12 and the overall average of inflation is maintained at 8.28.

4.1.4 Real Gross Domestic Product of Nepal

The real gross domestic product means the real value of all goods and services produced in an economy with in the particular fiscal year. The term real means inflation adjustment in nominal value. As formula given in methodology chapter, the GDP is converted in real term by dividing nominal GDP by GDP deflator. In order to convert nominal data into real fiscal year 2000/01 is considered as a base year, as also the Government of Nepal (GoN) use that fiscal year as base year by considering it the normal year.

The real gross domestic product (RGDP) of Nepal is also generally increasing over the period except year 2001 and 2015. In year 2001, the decreases in GDP may due to the Maoist insurgency in the country. There were many infrastructures been destroyed and there was sharp decrease in the investment from the domestic and international area. And, in 2015 the decrease in real gross domestic product is due to devastating earthquake and unofficial blocked by India. Therefore, there were decreases in the economic activity of Nepalese economy, hence decreases the real gross domestic product. The trend and nature of RGDP is given in Figure 4.5.

Figure 4.5: Trend of Real GDP (Base 2000/01) Rs. in Million
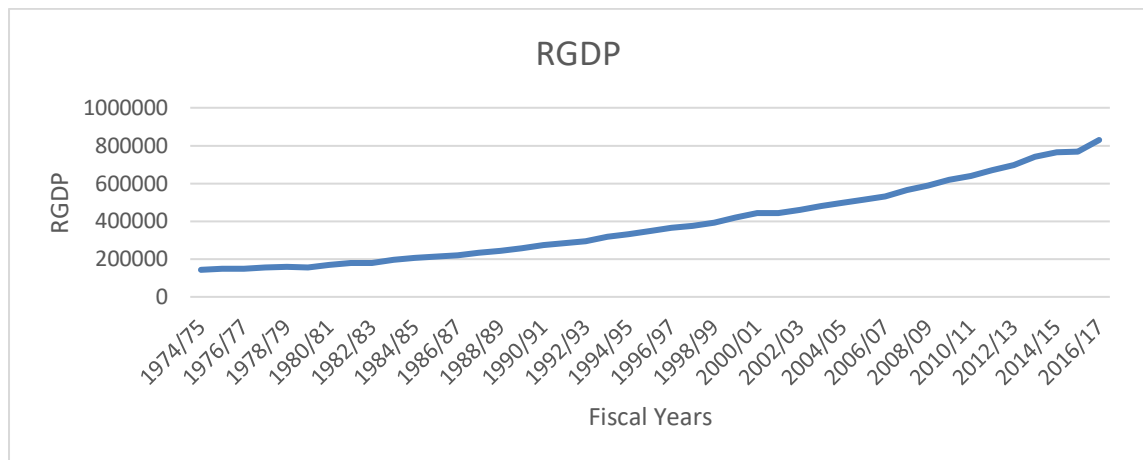
Source: Appendix-I.

Figure 4.5 shows the trend of real gross domestic product in Nepal since the fiscal year 1974/75 to 2016/17. In above figure Y-axis measure the value of real gross domestic product (RGDP) and X-axis measure the fiscal year. The figure value of real gross domestic product is rupees in millions. The RGDP of the country is also generally increasing over the period except year 2001 and 2015. However, the rate of increasing is not satisfactory as targeted by government of Nepal.

4.1.5 Economic Growth Rate of Nepal

The growth measures the percentage change in current period from previous period. Here the growth rate in real gross domestic product is calculated by deducting the value of real GDP in previous fiscal year from the value of real GDP in this fiscal year and dividing that differentiated value by the value of real GDP in previous fiscal year for all respective fiscal year. For more clear the formula for growth calculation is given in methodology chapter.

The trend of GDP is normally increasing over the period. However, in order to study the trend of its growth following Figure 4.5 is drawing. The trend of GDP growth looks fluctuating over the period. In FY 2001/02 and 2015/16 its growth rate is low. The trend of GDP growth is shown in following Figure 4.6.

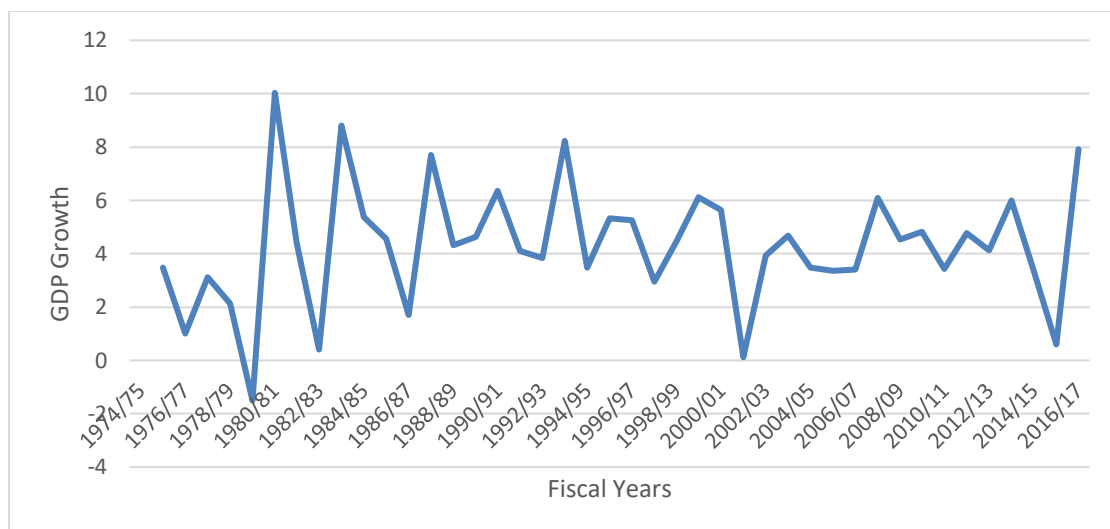**Figure 4.6: Trend of Real Gross Domestic Product Growth (in percent)**

Figure 4.6 shows the trend of real gross domestic product growth in Nepal since the fiscal year 1974/75 to 2016/17. In above figure Y-axis measure the rate of real gross domestic product growth and X-axis measure the fiscal year. The figure value of real gross domestic product growth is in percentage. The overall trend of GDP growth is fluctuating over the period. In FY 1980/81 the highest growth rate is recorded. Also in FY 1993/94 the growth rate is high. But in FY 2001/02 the growth rate is too low. It was because of the Maoist insurgency in the country. In FY 2015/16 the decreased in RGDP due to devastating earthquake and unofficial blocked by India. Therefore, there were decreases the economic activity in Nepalese economy. Again in FY 2016/17 this rate looks high. It was mainly the bounce effect of the earthquake and southern border blocked and may also some effect of gradual progress in political stability. For more detail wise analysis of the Real Gross GDP in Nepal following table is created.

4.1.6 Decade-wise Average Real GDP and Growth Rate in Nepal

Following table shows the decade wise analysis of real gross domestic product and its growth in Nepal.

Table 4.2: Decade-wise Average Real Gross Domestic Product and its Growth Rate

Fiscal Years	Real GDP (Rs. in millions)	RGDP Growth Rate (in %)
1974/75-1983/84	163006.2	3.542246
1984/85-1993/94	254560.5	5.084728

1994/95-2003/04	405739.1	4.198464
2004/05-2016/17	648298.9	4.295971
Overall Aggregate	387463.8	4.299042

Source: Author's Calculation Based on Appendix I and II.

Table 4.2 shows the decade wise average real GDP from 1974/75 to 2016/17. The average value of decade is calculated by arithmetic mean formula, that is, sum of all value of particular decade and then divides that total by number of year as formula shown in methodology chapter. The table shows that overall average of the real GDP is Rs. 387463.8 million which is higher than the RGDP from 1975 and 1985 decades. It shows the real GDP is increasing over the study period.

Figure 4.7: Decade - wise Average of GDP
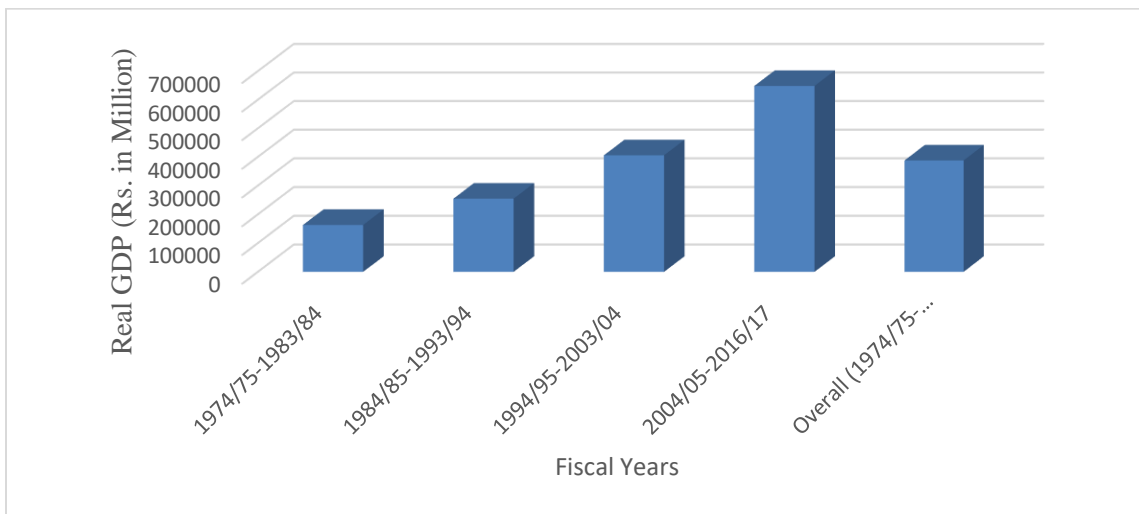
Source: Based on Table 4.2.

Figure 4.7 shows the decade wise average of GDP. The averages are in increasing trend. First decade shows the lowest average and the last decade shows the higher average. The overall average is of GDP is Rs. 387463.8 Million.

Similarly, decade-wise average of GDP Growth in Nepal is shown in Figure 4.8.

Figure 4.8: Decade - wise Average of GDP Growth

Figure 4.8 shows the decade wise average of GDP growth rate in Nepal. In the figure second decade shows the higher average of GDP growth. Likewise third decade shows the lowest average comparatively to other decades. The overall growth rate is recorded at 4.29 percent.

4.2 Stationary Test

Before run the regression model in order to check the impact of economic growth on inflation, it requires checking whether the used data for regression analysis are stationary or not. If the data are not stationary, then first of all it is necessary to convert into stationary. The stationary of time series data means that the mean, variance, and auto covariance (at various lag) remain the same at each point of time (i.e., they are time invariant).

There are several tests of stationary. Such as Graphical analysis, Correlogram test, Unit root test etc. However, this thesis uses the Unit Root Test. Because the Unit Root Test is the widely popular tool for econometric empirical analysis. The detail model for unit root test is explained in methodology chapter.

The macroeconomic time series data are generally non-stationary. It is said that if non-stationary data are used and run the model then the result of that model may be biased and lead to failure in predicting outcomes which leads to fake regressions where R-

Squared is approximately unity and t and F statistics become significant and valid. In order to avoid the problem of spurious regression, non-stationary data must be stationary which can be made through differencing the data. For this, Augmented Dickey Fuller test is used. Each variable is tested in both form intercept and intercept with trend which are presented in Table 4.3.The test is done simply by using econometric software E-views10.

Table 4.3 Augmented Dickey Fuller Tests for Unit Root

Variables	Level Form		First Difference (Δ in log)		Remarks
	Intercept	Trend and Intercept	Intercept	Trend and Intercept	
Ln_NCPI	-0.5948	-1.3871	-4.9804	-5.0514	I (1)
	(0.86)	(0.85)	(0.00)*	(0.00)*	
Ln_RGDP	0.2715	-3.1630	-7.8098	-6.4436	I (1)
	(0.97)	(0.10)	(0.00)*	(0.00)*	
Ln_RM2	-0.7586	-3.9035	-6.3522	-6.2282	I (1)
	(0.82)	(0.02)	(0.00)*	(0.00)*	
Ln_ICPI	0.0066	-2.2892	-4.7902	-4.7255	I (1)
	(0.95)	(0.43)	(0.00)*	(0.00)*	
Ln_RGCE	-1.9868	-2.3588	-5.4020	-5.2537	I (1)
	(0.29)	(0.39)	(0.00)*	(0.00)*	
Ln_EXR	-1.4021	-0.6423	-4.9620	-4.9816	I (1)
	(0.57)	(0.97)	(0.00)*	(0.00)*	
Ln_RFT	-0.9241	-1.8904	-3.4702	-3.5394	I (1)
	(0.77)	(0.64)	(0.01)*	(0.04)**	

Source: Author's Calculation through Excel.

Note: *shows 1% level of significance; ** shows 5% level of significance and numeric value in the parenthesis expresses p-values. The p-values are based on MacKinnon (1996) one-sided p-values.

Table 4.3, all the variables, gross domestic product, government expenditure, foreign trade, Broad money supply, Indian CPI and Exchange rate expressed in natural logarithmic. The Augmented Dickey Fuller tests shows all the variables are stationary at the 1% level of significance at first difference except real foreign trade, which is significance at 5 % level of significance. Thus, it is concluded that all variables are integrated of order 1, i.e. I(1).

4.2.1 Correlation Analysis

Two variables are said to have correlation when they are so related that the change in the value of one variable is accompanied by the change in the value of other. The measure of correlation called the 'correlation coefficient'. It is the measure degree or direction of movement. Correlation analysis only in determining the extent to which the two variables are correlated, however, it does not tell about cause and effect relationship. Though, there is a high degree of correlation two variable, it cannot be said, which one is the cause and which one is the effect. There are four main properties of correlation coefficient. They are: first, the value of correlation coefficient lies between -1 and +1. Second, the formula of correlation is symmetrical i.e., $r_{xy} = r_{yx}$. Third, the correlation coefficient is independent of change of origin and scale. And fourth, correlation coefficient is the geometric mean between two regression coefficients. When correlation coefficient is +1, there is positively perfect correlation between the two variables. Similarly, when correlation coefficient is -1, there is negatively perfect correlation between the two variables. And when correlation coefficient is zero, the variables are uncorrelated.

Table: 4.4 Coefficients of Correlation

Variables	Ln_NCPI	Ln_RGDP	Ln_RM2	Ln_ICPI	Ln_RGCE	Ln_EXR	Ln_RFT
Ln_NCPI	1	0.9962	0.9917	0.9983	0.6556	0.9769	0.9933
Ln_RGDP		1	0.9959	0.9985	0.6162	0.9659	0.9907
Ln_RM2			1	0.9941	0.6307	0.9502	0.9822
Ln_ICPI				1	0.6264	0.9711	0.9916

						1	0.6437	0.6326
Ln_RGCE						1	0.6437	0.6326
Ln_EXR							1	0.9839
Ln_RFT								1

Source: Author's calculation.

Table 4.4 shows the result of correlation coefficient matrix of used variables (NCPI, RGDP, RM2, ICPI, RGCE, EXR, and RFT). Correlation coefficients measure the degree or direction of movement, however, it does not tell about the cause and effect relationship. In other word, though, there is a high degree of correlation two variable, it cannot be said, which one is the cause and which one is the effect. Hence it further required the estimation of regression coefficient.

The correlation coefficient between national consumer price index and real GDP, between national consumer price index and exchange rate, between national consumer price index and Indian consumer price index, between national consumer price index and real capital expenditure, between national consumer price index and real broad money supply, and between national consumer price index and real foreign trade is 0.9962, 0.9769, 0.9983, 0.6556, 0.9917, and 0.9933 respectively. All these value of coefficients shows high degree of correlation. However, they do not tell the direction of effect and also does not tell the significance of impact.

Similarly, correlation coefficient between real GDP and exchange rate, between real GDP and Indian consumer price index, between real GDP and real capital expenditure, between real GDP and real broad money supply, and real GDP and real foreign trade is 0.9659, 0.9985, 0.6162, 0.9959, and 0.9907 respectively. Again, the correlation coefficient between exchange rate and Indian consumer price index, between exchange rate and real capital expenditure, between exchange rate and real broad money supply, and exchange rate and real foreign trade is 0.9711, 0.6437, 0.9502, and 0.9839 respectively. Similarly, the correlation coefficient between Indian consumer price index and real capital expenditure, between Indian consumer price index and real broad money supply, and Indian consumer price index and real foreign trade is 0.6264, 0.9941, and 0.9916 respectively. Again, the correlation coefficient between real capital expenditure and real broad money supply, and real capital expenditure and real foreign trade is 0.6307, and 0.6326 respectively. At last, the correlation coefficient between real broad

money supply and real foreign trade is 0.9822. Above this is just the explanation of correlation coefficient matrix of table 4.4. As the value of correlation coefficient does not tell the direction of effect/ role between variables, hence it further requires regression analysis.

4.2.2 Regression Analysis

The log multiple regression equation of the study is

$\ln NCPI = a + \beta_1 \ln RGDP + \beta_2 \ln RM2 + \beta_3 \ln ICPI + \beta_4 \ln RGCE + \beta_5 \ln EXR + \beta_6 \ln RFT + e_i$. The estimated result of regression equation in first difference of variables as they are stationary in first difference is given in Table 4.5.

Table: 4.5 Summary of Statistics

Variables	Coefficients	Std. Error	t-statistic	Prob.
C	0.0730	0.0169	4.3094	0.0001*
D(LN_RGDP)	-0.1613	0.2689	-0.5997	0.5525
D(LN_RM2)	-0.2526	0.1094	-2.3077	0.0270**
D(LN_ICPI)	0.4180	0.1527	2.7372	0.0097*
D(LN_RGCE)	0.0088	0.0277	0.3183	0.7521
D(LN_EXR)	0.1276	0.0701	1.8197	0.0774***
D(LN_RFT)	-0.0249	0.0679	-0.3668	0.7160
R-squared = 0.4757, Adj. R-squared = 0.3858, F-statistic = 5.2939, Prob. (F-statistic) = 0.0005, Durbin-Watson = 1.7554, N =43				

Source: Author's calculations from E-views.

Note: *significant at 1%, **significant at 5%,   ***significant at 10%

The regression result shows that p-value for GDP is 0.5525. It is more than even 10 percent level of significance. Hence there is no significance impact of economic growth (change in GDP) on inflation in Nepal. Though, the other control variables such as Indian inflation, exchange rate and broad money supply have significantly determined the Nepal's inflation as p-value for their t-test is significance. The P-value for Indian inflation is 0.00 and its t-test value is 2.7372, it shows this variable is significant even at 1 percent level of significance. Similarly, the t-test value for exchange rate is 1.8197, its p-value is 0.0774, which is less than 10 percent, and hence it is significant at 10 percent level of significance. In the same way, the t-test value for broad money supply is -2.3077 and its p-value is 0.0270, which is also less than 5 percent. Hence it is significant at 5 percent level of significance.

However, the result shows that government capital expenditure, GDP and foreign trade does not have significance impact as their respective p-value for t-test is 0.7521, 0.55625, and 0.7160. It means these three variables are not significantly determining the inflation of Nepal. The negative relationship between inflation and economic growth shows that decrease in the economic growth leads to increase the inflation in the country.

R-squared test shows the overall significance of the model. The value of R-squire shows the 0.4757. It means if other thing remains the same, about 47.5 percent variation in the inflation can be explained or addressed by the change in independent variables. The adjusted R-squared is 0.3858. It also shows the overall significance of the regression model. Other thing remain the same 38.5 percent variation in inflation is explained by the change in independent variables.

The F-statistic is 5.2939 and its corresponding probability is 0.00. As p-value of F-statistic is less than 1 percent, it shows it is significant at 1percent level of significance. It shows all the independents variables are significantly influence the dependent variable (inflation) collectively.

The test statistic value of D-W test is 1.7554. It is the range between 1.5 and 2.5. A rule of thumb is that test statistic values in the range of 1.5 to 2.5 are relatively normal. Values

outside of this range could be cause for concern. Hence there is no autocorrelation (or serial correlation) in residual for regression analysis. This is also tested under residual diagnostic section.

4.2.3 Residual Diagnostic Test

a. **Heteroskedasticity Test:** Breusch-Pagan-Godfrey test is used to test the heteroskedasticity by setting the following null hypothesis. The Breusch-Pagan-Godfrey test regressed the square residuals on the original regressors.

Null hypothesis: Residuals are not heteroskedasticity.

Table: 4.6 Heteroskedasticity Test: Breusch –Pagan – Godfrey

F-statistic	1.3863	Prob. F(6,35)	0.2475
Obs*R-squared	8.0647	Prob. Chi-Square(6)	0.2334
Scaled explained SS	14.2473	Prob. Chi-Square(6)	0.027

Source: Researcher's Calculation through E-view.

Table 4.6 the probability value of F-statistic, and Observed R-squared is more than 5 percent. It means that the null hypothesis is not rejected. Thus, it can be concluded that the difference form equation is free from heteroscedasticity.

b. **Serial CorrelationTest:** Breusch-Godfrey Serial Correlation LM test has been applied to test serial correlation by using the following null hypothesis.

Null hypothesis: There is no serial correlation

Table 4.7: Serial Correlation Test

F-statistic	0.5799	Prob. F(2,33)	0.5655
Obs R-squared	1.4261	Prob. Chi-Square (2)	0.4901

Source: Author's Calculation through E-view.

Table 4.7 the p-value of both F-statistic and Observed R-squared with degree of freedom two is higher than 5 percent. It means that the null hypothesis is not rejected. Then, it can be concluded that there is no serial correlation (no autocorrelation) in the difference form equation.

4.3 Granger Causality Test

Granger causality is a way to investigate the idea of cause and effect between two variables in a time series. The pair wise Granger causality test is analyzed as below:

a. Pair-wise Granger Causality Test

Pair-wise Granger Causality test has been used to test the causality between economic growth and inflation in Nepal. This study has chosen the Schwarz criterion for the causality between the consumer price index and real gross domestic growth. Table 4.8 shows the result for the pair wise Granger causality test between economic growth and consumer price index in Nepal.

Table 4.8: Results of Pair -wise Granger Causality Test

Sample: 41 (1974-2016)				
Lags: 2				
Null Hypothesis	Observation	F-statistics	Probability	Decision
1. Ln_RGDP does not Granger cause Ln_NCPI	41	0.42198	0.6589	Do not Reject
2. Ln_NCPI does not Granger cause Ln_RGDP	41	7.00134	0.0027	Reject*

*Null hypothesis rejected at 1 Percent level of significance.

Source: Author's Calculation through E-Views.

Table 4.8 shows the result of pair wise Granger causality tests between LN_RGDP and LN_NCPI. The p-value for the first null hypothesis (i.e., Ln_RGDP does not Granger cause Ln_NCPI) is 0.6589.It is greater than even 10 percent level of significance. Therefore, the null hypothesis is not rejected. It means that the null hypothesis is accepted. In other words, change in economic growth (change in Ln_RGDP) does not cause inflation (change in Ln_NCPI) in Nepal.

Though, the p-value for the second null hypothesis (i.e., Ln_NCPI does not Granger cause (Ln_GDP) is 0.0027.This is less than 1 percent level of significance. Therefore, the null hypothesis is rejected. It means, the change in inflation (change in Ln_NCPI) does cause change in economic growth (change in Ln_GDP) in Nepal.

Therefore, the conclusion is that there is unilateral causality between economic growth (LN_GDP) and inflation (LN_NCPI) in Nepal is that, inflation causes economic growth but economic growth does not causes inflation in Nepal.

CHAPTER - V

MAJOR FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Major Findings

Inflation and economic growth is the major macroeconomic variable for every nation. These two variables are linked with each other. The high and persistence rise in general price level over the period of time is said to be inflation. It is generally calculated by change in national consumer price level of the economy. High and persistent inflation and low economic growth have been major characteristics of Nepalese economy. High inflation distorts the optimal allocation of resources and retard growth, weakens the external sectors, and lowers the domestic financial saving among others. Therefore, there is a consensus that high inflation is bad for the economy and thus central bank around the world strives to fight against the high inflation and maintain it at low level.

Classical economists argued about the dichotomy between the real and nominal variables means money supply only affect the price level, and saving (hence investment) is the major determinants for economic growth. The Keynesians apply the aggregate demand (AD) and aggregate supply (AS) to illustrate the output-inflation relationship. In short-run, the AS curve is upward sloping implies that stimulating the demand side of the economy affect both prices and output. The monetarists argued that inflation persists in the economy as the supply of money exceeds the growth rate of economy. The neo-classical economists developed the portfolio management theory and suggested that inflation causes individuals to substitute out of money and into interest earning assets, which leads to greater capital intensity and promotes economic growth.

Neo-Keynesian economists developed the concept of potential output (also known as natural output) and argued that inflation is determined by the actual level of output and level of unemployment. If the actual level of output is higher than the potential level and unemployment is below the natural rate, inflation accelerated that causes the shift in Philips curve to outward indicating higher inflation with higher unemployment. What so

ever the theoretical approach, reviewing the different international empirical literatures gives three alternatives conclusion (no relationship, positive relationship, and negative relationship) about the relationship between inflation and economic growth.

There is increasing trend of NCPI in Nepal. However, the trend of percentage change in inflation (NCPI) seems fluctuation in nature. In FY1990/91 the inflation is all time high of study period, that is 21.1 percent. But the inflation seems all time low which is 2.4 percent in FY2000/01. The decade wise study of national consumer price index and inflation shows that the average NCPI is in increasing over the succeeding decades. The trend of RGDP is seems normally increasing over the study period. However, the trend of RGDP growth looks fluctuating over the period. In FY2001/02 (may be because of the Maoist insurgency in the country) and 2015/16 (may be due to devastating earthquake and unofficial blocked by India) the growth rate is very low. In FY1993/94 the growth rate is all time high. And the decade wise study of RGDP and its growth, it shows that the RGDP is increasing in succeeding decades.

The log-linear regression model (exponential model) had used to analysis the role of economic growth on inflation in Nepal. The main reason behind using log-linear model is that the slope coefficient measures the percentage change in consumer price index (inflation)for a given percentage change in gross domestic product (economic growth) and other control variables, that is, role of economic growth on inflation in Nepal. Stationary test were conducted before run the regression mode. Time series data were made stationary by first difference.

The regression result shows that p-value for GDP is 0.5525. It is more than even 10 percent level of significance. Hence there is no significance impact of economic growth (change in GDP) on inflation (change in CPI) in Nepal. But the control variables (exchange rate, Indian inflation and broad money supply) significantly determine the Nepal's inflation as p-value for their t-test is significance.

The P-value for Indian inflation is 0.00 and its t-test value is 2.7372. It shows that the variable is significant even at 1 percent level of significance. Similarly, the t-test value of exchange rate is 1.8197 and its p-value is 0.0774. Hence it is significant at 10 percent

level of significance. Similarly, the t-test value for broad money supply is -0.23077 and its p-value is 0.027, which is less than 5 percent. Hence it is significant at 5 percent level of significance. Though, the result shows that government capital expenditure, GDP and foreign trade does not have significance impact as their respective p-value for t-test is 0.7521, 0.5525, and 0.7160, it means these three variables are not significantly determining the inflation of Nepal. The negative relationship between inflation and economic growth shows that decrease in the economic growth leads to increase the inflation in the country.

The value of R-square and adjusted R-squared is 0.4757 and 0.3858. It means if other things remain the same, about 47.5 percent variation in the inflation can be explained or addressed by the change in independent variables. The F-statistic is 5.2939 and its corresponding probability is 0.00 which is less than 1 percent, it shows all the independents variables significantly influence the dependent variable (inflation) collectively. The test statistic value of D-W test is 1.7554. It is the ranges between 1.5 and 2.5. Values outside of this range could be cause for concern. Hence there is no autocorrelation (or serial correlation) in residual for regression analysis. Heteroscedasticity test, and serial correlation test were done to residuals diagnostic of regression result and result shows that there is no heteroscedasticity, no serial correlation.

The p-value for the first null hypothesis (i.e., Ln_GDP does not Granger cause Ln_NCPI) is 0.6589.It is greater than even 10 percent level of significance. Therefore, the null hypothesis is not rejected. It means change in economic growth (change in Ln_GDP) does not cause inflation (change in Ln_NCPI) in Nepal. Though, the p-value for the second null hypothesis (i.e., Ln_NCPI does not Granger cause Ln_GDP) is 0.0027.This is less than 1 percent level of significance. Therefore, the null hypothesis is rejected. It means, the change in inflation (change in Ln_NCPI) does cause change in economic growth (change in Ln_GDP) in Nepal.

Indian inflation, exchange rate, and broad money supply are the main and significance cause for inflation in Nepal. The other national macroeconomics variables such as economic growth, government capital expenditure, and foreign trade are theoretically

causes of inflation but the empirical analysis of Nepalese data of these variables shows that they are not significantly causes of inflation in Nepal.

5.2 Conclusion

The inflation and GDP growth in Nepal shows fluctuating over the study period. Even though it is fluctuating the inflation is decreased currently as compared to previous fiscal year. Similarly, GDP is found to be in increasing that of previous year, thus it can be said that the Nepalese economy is recovering and is in a healthy state, which is also a good indicator of economic prosperity. There is no significance impact of economic growth (change in GDP) on inflation (change in NCPI) in Nepal. But the some control variables (trade, Indian inflation and exchange rate) are significantly determine the Nepal's inflation as p-value for their t-test is significance. The negative relationship between inflation and economic growth shows that decrease in the economic growth leads to increase the inflation in the country though the empirical result shows no significance impact.

The result of pair wise Granger causality shows that there is unilateral causality between economic growth (LN_GDP) and inflation (LN_NCPI) in Nepal. That is, inflation causes economic growth but economic growth does not causes inflation in Nepal. The result shows that Indian inflation, Exchange rate, and foreign trade are the main and significance cause for inflation in Nepal. Hence, it is concluded that foreign sectors have a dominance role as a cause of inflation in Nepal. The national macroeconomic variables such as economic growth, government capital expenditure, and foreign trade are theoretically causes of inflation but the empirical analysis of Nepalese data of these variables shows that they does not significantly causes the inflation in Nepal. As these national does not have significantly cause in inflation, it is concluded that the structural bottleneck and other supply side problems might be the domestic causes of regional disparity in inflation and its fluctuation.

The finding of this study is similar to the findings of the Chaudhary and Xiumin (2018). Their study suggested that the prices in Nepal are highly dependent on Indian prices. Similarly, this study has also concluded the same result.

5.3 Recommendations

Following are the recommendations based on the above major findings and conclusion of the study.

a) From the conclusion of negative relationship between inflation and economic growth, there is insignificant impact of GDP on inflation thus; concentration on economic growth will not highly impact on inflation in Nepal. Hence policy measure can more focus on economic growth without much fear on price level.

b) The inflation in Nepal is highly prone to foreign sector as this research concluded that the foreign sectors (such as Indian inflation and Exchange rate) have main dominance role on cause of inflation in Nepal. Hence, Government of Nepal and Nepal Rastra Bank should be proactive in order to prevent the probable shocks and take action against any financial instability that originate from foreign sector (specially from India).

c) As domestic macroeconomic variables (such as economic growth, government expenditure, and foreign trade) do not significantly cause the Nepal's inflation, therefore it is concluded that the structural bottleneck and other supply side problems are the cause of regional disparity in inflation or its fluctuation. Hence the government and all concerned stakeholders should focus to tackle the problem of structural bottleneck and need to be made high investment for quality physical infrastructures.

5.4 Direction for Future Research

This study is based only on few macroeconomic variables as independent variables. So, the further study can be taken using some other independents variables as well. Similarly, the study used only the basic form of granger causality test so that it would be better to study in advance level of granger causality test to get the more and better results.

APPENDIX-I

NCPI, RGDP, Broad Money Supply,Indian CPI, Real Government Capital Expenditure, Real Exchange Rate, Real Foreign Trade (base year: 2000/01)

Fiscal Years	NCPI	RGDP (Rs.in million)	RM$_2$ (Rs.in million)	ICPI		RGCE (Rs.in million)	EXR (Rs.per USD)	RFT (Rs.in million)
1974/75	11.2185	143080	18401.7	14.4786		8622.34	10.5	24104.8
1975/76	11.1409	148042	22655.3	15.3094		11120.3	12.13	28431.3
1976/77	11.4421	149538	28167.9	14.1406		13094.6	12.45	27728.3
1977/78	12.7199	154215	29655.2	15.3174		14214	12.27	27640.2
1978/79	13.1569	157500	34289.1	15.703		15040	11.9	31781.7
1979/80	14.4439	155131	36591.8	16.6849		15983.2	11.9	32059.1
1980/81	16.3773	170693	38514.9	18.5812		16676.1	11.9	36861.4
1981/82	18.0836	178223	41241.8	21.0182		20609.3	12.9	35511.7
1982/83	20.6457	178949	44669.9	22.6759		24131.4	13.7	36065.6
1983/84	21.9333	194692	47668.1	25.3673		23543.2	15.4	37469
1984/85	22.842	205170	53833.3	27.4783		24029	17.83	45892.2
1985/86	26.4613	214538	57287.5	29.0048		23480	19.85	46933.5
1986/87	29.9732	218184	58379.5	31.5372		24615.3	21.59	46363.4
1987/88	33.2075	234977	64511.4	34.312		28391.2	22.11	54156.8
1988/89	35.9684	245146	73967.9	37.5322		34276.7	25.53	56880.4
1989/90	39.4582	256509	79964.1	38.7567		32939.9	28.54	59508.8
1990/91	43.3299	272839	87035.7	42.2336		36878.7	31.85	70653.2
1991/92	52.4525	284048	87070.2	48.0915		31481.4	42.5	87024.4
1992/93	57.1015	294974	102138	53.7605		33998.4	45.49	98897.8
1993/94	62.212	319219	112160	57.1807		34058.1	49.01	113908
1994/95	66.976	330291	120916	63.0197		29555.2	49.7	121415
1995/96	72.4242	347921	127930	69.4634		34491.9	54.96	130254
1996/97	78.2841	366225	132493	75.6993		33905.4	56.75	148421
1997/98	84.8017	376999	149127	81.1226		34131.3	61.66	137398
1998/99	94.4514	393903	161776	91.8557		24342.8	67.63	130439
1999/00	97.6559	417992	190588	96.1452		26092.3	68.74	162128
2000/01	100.034	441518	214382	100		28297.7	73.48	171284
2001/02	102.924	442049	217624	103.685		24069.5	76.53	149949
2002/03	107.813	459488	228091	108.239		20736.1	77.49	161653
2003/04	112.085	481004	247406	112.358		20605.4	73.49	169681
2004/05	117.173	497739	256408	116.591		23333.8	71.76	177669
2005/06	126.503	514486	274164	121.542		23404	72.03	184988
2006/07	133.966	532038	295237	129.012		29656.7	70.2	189658
2007/08	142.948	564517	346544	137.23		37437.5	64.72	196718
2008/09	160.933	590107	391790	148.691		45415.6	76.58	218828
2009/10	176.344	618529	408064	164.864		22971.9	74.24	246767
2010/11	193.202	639694	476869	184.635		24496.5	72.07	238359
2011/12	209.267	670279	540125	200.99		24557.5	80.72	256098
2012/13	229.855	697954	572263	219.707		23753.4	87.66	275677
2013/14	250.728	739754	624568	243.672		26600.4	97.95	321606
2014/15	268.818	764336	698541	259.895		33016.7	99.19	319920
2015/16	295.533	768835	759501	272.648		41399.9	106.05	285490
2016/17	308.683	829617	839600	286.139		67625.9	105.91	344419
Average	95.01	387463.80	218423.60	92.24		27141.41	50.43	133411.40

Source: NRB (2017) and World Bank (2018)

APPENDIX-II

Time Series Data on Inflation Rate and RGDP Growth Rate

Fiscal Years	Inflation Rate	RGDP Growth			
1975/76	-0.692	3.468278	2000/01	2.4348	5.628431
1976/77	2.70343	1.010278	2001/02	2.88972	0.120154
1977/78	11.1675	3.12771	2002/03	4.74934	3.945112
1978/79	3.43597	2.130284	2003/04	3.96306	4.682601
1979/80	9.78195	-1.50401	2004/05	4.53885	3.479104
1980/81	13.3852	10.03121	2005/06	7.96251	3.36455
1981/82	10.4187	4.411467	2006/07	5.9	3.411664
1982/83	14.168	0.40747	2007/08	6.70444	6.104589
1983/84	6.23693	8.797526	2008/09	12.5819	4.533133
1984/85	4.14279	5.381883	2009/10	9.57612	4.816404
1985/86	15.8449	4.565749	2010/11	9.55942	3.421817
1986/87	13.272	1.699752	2011/12	8.31501	4.781235
1987/88	10.7904	7.696655	2012/13	9.8383	4.128857
1988/89	8.31434	4.327698	2013/14	9.0809	5.988949
1989/90	9.70225	4.635036	2014/15	7.21493	3.322905
1990/91	9.81228	6.36643	2015/16	9.93808	0.588679
1991/92	21.0538	4.108085	2016/17	4.44946	7.905742
1992/93	8.86317	3.84675	Average	8.2864	4.2990
1993/94	8.9499	8.219239			
1994/95	7.65777	3.468447			
1995/96	8.13452	5.337613			
1996/97	8.09099	5.260967			
1997/98	8.32562	2.942081			
1998/99	11.3792	4.48372			
1999/00	3.39275	6.11551			

APPENDIX-III

Time Series Data for Different variables in Logarithm Form

FiscalYears	ln_NCPI	ln_RGDP	ln_RM2	ln_ICPI	ln_RGCE	ln_EXR	ln_RFT
1974/75	2.417567	11.87116	9.820199	2.672669	9.062112	2.351375	10.09017
1975/76	2.410623	11.90525	10.02815	2.728469	9.316527	2.495682	10.25525
1976/77	2.437298	11.9153	10.24594	2.649054	9.479959	2.521721	10.23021
1977/78	2.543166	11.9461	10.29739	2.728988	9.561981	2.507157	10.22703
1978/79	2.576949	11.96718	10.44258	2.753852	9.618467	2.476538	10.36665
1979/80	2.670275	11.95203	10.50758	2.814506	9.679292	2.476538	10.37534
1980/81	2.795896	12.04762	10.5588	2.922151	9.721734	2.476538	10.51492
1981/82	2.895005	12.09079	10.62721	3.045387	9.933497	2.557227	10.47762
1982/83	3.027506	12.09486	10.70705	3.121304	10.09127	2.617396	10.4931
1983/84	3.088008	12.17917	10.77202	3.233461	10.06659	2.734368	10.53127
1984/85	3.128601	12.23159	10.89365	3.313395	10.08702	2.880882	10.73405
1985/86	3.275683	12.27624	10.95584	3.367462	10.0639	2.988204	10.75649
1986/87	3.400304	12.2931	10.97472	3.451167	10.11112	3.07223	10.74427
1987/88	3.502775	12.36724	11.0746	3.535496	10.25383	3.09603	10.89964
1988/89	3.582642	12.40961	11.21139	3.625198	10.44222	3.239854	10.94871
1989/90	3.675242	12.45492	11.28933	3.657303	10.40244	3.351307	10.99388
1990/91	3.768844	12.51664	11.37407	3.743216	10.51539	3.461037	11.16554
1991/92	3.959908	12.5569	11.37447	3.873106	10.35715	3.749504	11.37394
1992/93	4.04483	12.59464	11.53408	3.984538	10.43407	3.817493	11.50184
1993/94	4.130548	12.67363	11.62768	4.046217	10.43582	3.892024	11.64314
1994/95	4.204335	12.70773	11.70285	4.143448	10.29401	3.906005	11.70697
1995/96	4.282541	12.75973	11.75924	4.2408	10.44848	4.006606	11.77724
1996/97	4.360344	12.811	11.79428	4.326768	10.43133	4.038656	11.90781
1997/98	4.440316	12.84	11.91256	4.395961	10.43797	4.121635	11.83063
1998/99	4.548086	12.88386	11.99397	4.520219	10.09999	4.214052	11.77866
1999/00	4.58145	12.94322	12.15787	4.56586	10.1694	4.230331	11.99614
2000/01	4.605507	12.99798	12.27551	4.605171	10.25053	4.297013	12.05108
2001/02	4.633994	12.99918	12.29053	4.641357	10.0887	4.337683	11.91805
2002/03	4.680394	13.03787	12.3375	4.684342	9.93963	4.350149	11.99321
2003/04	4.71926	13.08363	12.41879	4.721694	9.933308	4.297149	12.04168
2004/05	4.763648	13.11783	12.45453	4.758674	10.05766	4.273327	12.08768
2005/06	4.840262	13.15092	12.52148	4.800261	10.06066	4.277083	12.12805
2006/07	4.897587	13.18447	12.59554	4.859902	10.29744	4.251348	12.15298
2007/08	4.96248	13.24373	12.75576	4.921655	10.53043	4.17007	12.18953
2008/09	5.08099	13.28806	12.87848	5.001868	10.72361	4.338336	12.29604
2009/10	5.172439	13.3351	12.91918	5.105123	10.04203	4.307303	12.4162
2010/11	5.263736	13.36875	13.075	5.218383	10.10628	4.277638	12.38153
2011/12	5.34361	13.41545	13.19956	5.303256	10.10877	4.390986	12.45332
2012/13	5.437449	13.45591	13.25735	5.392296	10.07548	4.473466	12.52698
2013/14	5.524369	13.51407	13.34482	5.495823	10.18868	4.584457	12.68108
2014/15	5.594034	13.54676	13.45675	5.560277	10.40477	4.597037	12.67583
2015/16	5.688781	13.55263	13.54042	5.60818	10.63103	4.663911	12.56196
2016/17	5.732314	13.62872	13.64068	5.656477	11.12175	4.66259	12.74961
Average	4.1090	12.7258	11.7813	4.1346	10.1413	3.6704	11.5029

Source:NRB (2017) and World Bank (2018)

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