

**IMPACT OF INFLATION ON ECONOMIC GROWTH
AND UNEMPLOYMENT IN NEPAL (1990-2018)**

A Thesis

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MASTER OF ARTS

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ECONOMICS

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LETTER OF RECOMMENDATION

This thesis entitled "*Trend Analysis of Impact of Inflation on Economic growth and Unemployment (2090-2018)*" is prepared by Hari Prasad Sapkota under my supervision. I hereby recommend this thesis for approval by the thesis committee.

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Date: 8th August, 2019

APPROVAL SHEET

We certify that the thesis entitled "*Trend Analysis of Impact of Inflation on Economic Growth and Unemployment (1990-2018)*" submitted by Hari Prasad Sapkota to Department of Economics, Prithvi Narayan Campus, Pokhara, Faculty of Humanities and Social Sciences, Tribhuvan University in partial fulfillment of the requirement for the degree of MASTER of ARTS in ECONOMICS has been found satisfactory in scope and quality. Therefore, we accept this thesis as a part of the said degree.

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ABSTRACT

This study entitled *"Impact of Inflation on Economic Growth Rate and Unemployment: Trend Analysis (1990 to 2018)"* has been carried out in partial fulfillment for the degree of Master of Arts in Economics.

The study analyzes the trend of inflation in Nepal and its impact on economic growth and unemployment. The data for this study have been collected through annual reports of IMF, NRB and MOF, journals, economic survey and related publications. Thus data have been presented in tables, figures, percentage and ratio, correlation coefficient and regression line are used to clarify the facts under study. The trend line and diagrams are also useful to justify the objectives of study.

The study found, the relationship between inflation and economic growth rate is very much insignificant. Value of correlation coefficient between inflation and economic growth rate is only 0.000154. The linear regression line of economic growth rate with inflation rate is obtained as $G = 4.4437 - 0.008597 I$. It shows that in 0% inflation rate economic growth rate is 4.4437% and in 1% inflation rate economic growth rate decreases by 0.008597%.

The relationship between inflation and unemployment rate is found very much less influential to each other. The correlation ship between these two variables is found 0.000000679. It shows that inflation and unemployment are completely independent to each other. The regression line of unemployment on inflation is $U = 1.67436 - 0.008668 I$. It shows that in absence of inflation, unemployment rate is 1.67436% but in 1% inflation rate unemployment rate decreases by 0.008668%.

It shows that inflation has very less impact on economic growth rate and unemployment rate. In the context of Nepal, inflation, economic growth rate and unemployment rate are independents.

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LIST OF ACRONYMS

ADB	:	Asian Development Bank
B.S.	:	Bikram Sambat
CBS	:	Central Bureau of Statistics
CPI	:	Consumer Price Index
FY	:	Fiscal Year
GDP	:	Gross Domestic Product
GON	:	Government of Nepal
ILO	:	International Labor Organization
IMF	:	International Monetary Fund
MOF	:	Ministry of Finance
NKPC	:	New Keynesian Phillips Curve
NRB	:	Nepal Rastra Bank
SPI	:	Sensitive Price Index
SWRI	:	Salary and Wage Rate Index
UN	:	United Nation
WB	:	World Bank
W.R.T.	:	With Respect To
WPI	:	Whole sale Price Index

CHAPTER 1

INTRODUCTION

1.1 General Background:

Nepal is a landlocked country geographically located with latitude 26° 22' North 30° 27' North and longitude 80° 04' East to 88° 12' East to South Asia. Though it occupies only 0.03% and 3% of total land area of world and Asia, the country has extreme topography and climate. It is also renowned as law of Mt. Everest and the birth place of Lord Buddha. Mean length of Nepal is 885km and mean breadth is 193km. Growth rate of GDP is 5% in the year 2017/18. 21% of population lives below poverty line as per the Nepal living standard survey 2017/18. And the Gini-Coefficient, which indicates inequality in income distribution is 0.31 (C.B.S. Bulletin; 2019)

Inflation is the rate of increase in prices over a given period of time. Inflation is typically abroad measure, such as the overall increase in prices or all the increase in the cost of living in a country (C.onera 2010 P-4). According to pigou. "Inflation exists when money income is expanding more than in proportion to increase in earning activity." According to Goutborn, "Inflation is too much currency in relation to physical volume of business." Crowther define inflation as, "a state in which the value of money is falling, that is prices are rising." According to Ackley, "Inflation is a persistent and appreciable rise in the general level or average of prices." By analyzing these definition.

- Inflation is rise price level of goods and services.
- Inflation is too much money supply in an economy.
- Inflation is too much money chases a few goods.
- Inflation is fall in value of money rise value of money rise value of goods and services. (B. Dhungel and R.B,Bista; 2013.p-100)

Table 1.1

Inflation rate of South Asian Countries 2018

S.N.	Country	2017	2018
1.	World	4.55	4.6
2	U.S.A	2.4	2.4
3	China	2.5	2.1
4	India	5.0	4.9
5	Pakistan	5.0	5.19
6	Bangladesh	6.0	5.5
7	Srilanka	4.8	2.1
8	Nepal	6.0	4.2
9	Maldives	1.5	-0.1
10	Bhutan	4.1	2.7
11	Afghanistan	5.0	5%

Source: IMF Report 2019, April.

Economic growth is the change in the GDP in a country during certain interval of time. GDP is the sum of the value of all the products produced in a country during fiscal year. It is found one of the indicators of the production and growth of the economy and play a strategic role in development, employment and the balance of payment (Volker; 2005).

According to the world economic outlook published by International Monetary Fund (IMF) 2019; world economic growth is increased by 3.8% in 2017 whereas it is increased by 3.9% in 2018. The Indian economy grew by 6.7 percent in 2017, is increased by 7.4% in 2018. The Chinese economy which grew by 6.9 percent in 2017 and by 6.6 percent in 2018. Economic growth rate of Nepal is fluctuated highly in last decade and it was 6% in 2014, 3.3% in 2015, 0.4% in 2016, 7.5% in 2017 and 5% in 2018.

Table 1.2

Economic Growth Rate of South Asian Countries in percent.

S.N.	Country	2017	2018
1	World Economy	3.8	3.9
2	Low income developing countries	4.7	5.0
3	China	6.9	6.6
4	India	6.7	7.4
5	Pakistan	5.3	5.6
6	Afghanistan	2.5	3
7	Sir Lanka	3.1	3.5
8	Maldives	4.8	5.0
9	Bhutan	6.1	7.1
10	Nepal	7.5	6.5
11	Bangladesh	7.1	7.0

Source: IMF Report 2019, April

According to the ILO guidelines, a person is unemployed if the person is (a) not working, (b) currently available for work (c) Seeking work.

The without work condition serves to distinguish between the employed and the unemployed and thus guarantees that these are mutually exclusive categories of the working age population, whereas the currently available for work and seeking work separate the non-employed into unemployed and the out of labour force. The purpose of the availability for work condition is to exclude those individuals who are seeking work to start at a later date and thus is a test of current readiness. The intention of the seeking work criterion is on the other hand, to ensure that a person will have taken certain active steps to be classified as unemployed. (Byrne & Strobl; 2000, 5).

Unemployment problem has become a great concern all over the world. According to I LO report 2017, 6 percent of world population was without a job of the world's workforce. (Aktar; 2012, 1)

According to the population composition of Nepal, about 500 thousand person are entered to the labour market every year. Due to lack of employment opportunities in the country attraction of foreign employment is still high. About 4.30 million youths have gone abroad in foreign employment through formal and informal way. Out of total foreign employment, skilled workers are 1.5 percent, semi-skilled workers are 24 percent and non-skilled workers are 74.5 percent. According to the latest labour force survey, unemployment rate in Nepal is 2.2 percent and semi-unemployment rate is 30. Percent similarly, the youth underemployment rate is 35.8%. Currently one thousand Nepali youth have been going abroad daily for foreign employment. [Economic Survey; 2018, 51).

Table 1.3
Unemployment Rate of South Asian Countries in percent.

S.N.	Country	2017	2018
1.	World	5.6	5.5
2.	China	3.6	3.8
3.	India	3.6	6.6
4.	Pakistan	6	5.9
5.	Bangladesh	4.2	4.2
6.	Bhutan	3.2	3.2
7.	Nepal	3	3
8.	Srilanka	4	4.7
9.	Maldives	5.8	6
10.	Afghanistan	8.8	8.8

Source: I.M.F. Report: 2019

Inflation, economic growth rate and unemployment are main indicators of an economy. In Nepalese economy, inflation rate is steady and comparatively high. But economic growth rate is fluctuates significantly in successive fiscal years. Similarly, unemployment rate is very high and millions of people are migrated for foreign country for job opportunity. So, this study is about to state the relationship between three variables of economy based on base year 2001. In which, inflation is taken as free variable and Economic growth rate and unemployment as a dependent variable on inflation.

1.2 Statement of Problem.

Theoretic literature indicates that relationship between the inflation and economic growth are positive, negative or neutral. Also the empirical findings are highly diversified based on the economic conditions, methodology employed, data used, natures if the study whether cross section, panel data or country specific and time period of the study as well as the number of explanatory variables included in the model. Price stability is considered as the key variable to promote economic growth as well as sustainable development. As money loses its value people lose confidence in it as a medium of exchange. The resulting effect is a fall in saving and consequently (lower investment as well as economic growth (Ruzima; 2016, P. 8)

Much of economic literature identified investment is the main channel through which inflation impedes economic growth. That is, high inflation rate hurts economic growth. That is, high inflation rat hurts economic growth. However, same studies did not find this negative evidence for data covering the period 1950-1960. The debate about the relationship between inflation and economic growth remained imprecise till 1970, the relationship was either neutral or positive. The huge empirical studies about the correlation between inflation and economic growth have been conducted to support the inflation- growth theories but they came out with inconclusive results. (Ruzima; 2016, 9)

Macroeconomic policy aims to promote economic growth and development, employment creation improve living standard and equal distribution of income in the society. However, there is no consensus on the appropriate conduct of monetary policy to achieve the twin goals of low inflation and low unemployment. (Govera: 2015,1)

Economists and policy makers do not satisfactorily understand the effects of monetary policy on employment creation. On the one hand, it is argued that an inverse relationship exists between inflation and unemployment which can be exploited to attain a low unemployment based on the statistical findings byPhillips (1958) on the other hand, it is argued that the price stability is regarded as an important precondition for the attainment of economic growth and consequently job creation. The argument justifies the use of inflation targeting as the main monetary policy control mechanism by central bank. Despite this argument, it is generally accepted that monetary policy does not influence growth rate and employment in the long run. (Govera 2015, 2)

In the context of Nepal, inflation rate is continuously persists at higher rate for long period of time. But economic growth rate and unemployment are fluctuating in higher rate consecutive fiscal years too. So, it is obviously important issue to study about the trend of inflation and its impact in economic growth rate and unemployment of Nepal. In this study the following issues are raised to investigate.

- What is the trend of inflation in Nepal?
- What is the relationship between inflation and economic growth?
- What is the relationship between inflation and unemployment?

1.3 Objectives of the Study

General objectives of this study are to analyze trend of inflation in economic growth rate and unemployment in Nepal. The specific objectives are:

- i. To explain the trend of inflation in Nepal.

- ii. To show the relationship between inflation and economic growth rate
- iii. To analyze the impact of inflation in economic growth rate.
- iv. To show the relationship between inflation and unemployment.
- v. To show the impact of inflation on the unemployment rate.

1.4 Formulation of Hypothesis

Prof. R.A. Fisher has proved that under null hypothesis, the variables are uncorrelated in population [Sutihar 2017, 495]. So, hypothesis for this study is formulated as.

- A. Null hypothesis $H_0 \rho = 0$ ie. the variable inflation (I) and economic growth rate (G) are not correlated.

Alternative hypothesis $H_1 \rho \neq 0$ The variables inflation (I) and economic growth rate (G) are correlated.

- B. Null hypothesis $H_0 \rho = 0$ ie the variables inflation rate (I) and unemployment rate (U) are not correlated.

Alternative hypothesis: $H_1 \rho \neq 0$ the variables inflation rate (I) and unemployment rate (U) are correlated.

1.5 Significance of the Study

Inflation affects economy in various positive and negative ways. The negative effects of inflation includes on increase in the opportunity cost of holding money, uncertainty over future inflation which may discourage investment and saving. Positive effects include reducing the real burden of public and private debt, keeping nominal interest rates above zero. So that central banks can adjust interest rates to stabilize the economy and reducing unemployment due to wage rigidity. (Singh 2018, 7). Inflation is caused by an excessive growth of money supply or excessive demand of goods. (Mocan 1995 cited in R. Sigh 2018, 8). Inflation caused by money supply (monetary policy) or increase in

demand of goods has important impact on macroeconomic variables of the country either positively or negatively with various degree.

Due to change in political condition and instability in political situation Nepal has been suffered by economical instability on economic policy, monetary policy and fiscal policy. There is no common consensus about political parties and economist to control high inflation rate, low economic growth rate and high unemployment. So, this study, will provide necessary information about the inflationary trend in Nepal and its impact to macroeconomic indicator economic growth rate and unemployment.

1.6 Limitations of the Study

There are numbers of factors influencing inflation, economic growth rate and unemployment in economy. But in this study, studying and analyzing that all factors is not possible and the study is carried out based on following data and limitations.

- i. Over all study is carried out based on published secondary data. And correctness of data is not tested by any secondary tools.
- ii. The research is confined only in Nepalese economy.
- iii. The research is carried out based on the data in time - series from 1990 AD.to 2018 AD. The result or conclusion derived from this study may not equally acceptable before 1990 AD.

1.7 Organization of the Study

The study is divided into five chapters. The format of each chapter is given below.

Chapter 1: This is an introductory part of the present study. It includes background of the study, statement of the problems, objectives, significance of study, limitation of organization of study.

Chapter II: This chapter is related with literature review. It is divided into two parts theoretical review and research review in which various books and attacks have been reviewed under this heading.

Chapter III: In this chapter, the research methodology has been discussed.

Chapter IV: This chapter present the trend of inflection in Nepal and its impact on economic growth rate and unemployment rate.

Chapter V: This chapter includes the summery, conclusion and suggestion.

The appendices and bibliography are given at the end of the thesis.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter trace the concept of inflation and its historical background and prospective of inflation in Nepal. Next to that Phillips curve model and its emergence is explained in short, the remaining chapter discusses the empirical literatures of different researchers and in last there is conclusion of literature review.

2.1 Historical Background of Inflation

Historically, rapid increases in the quantity of money or in the overall money supply have occurred in many different societies throughout history changing with different forms of money used. When gold was used as currency, the government could collect gold coins, melt them down, mix them with other metals such as silver copper or lead as reissue them at the same nominal value. This practice would increase the money supply but at the same time, the relative value of each coin would be lowered. As the relative value of coins becomes lower and consumers would need to give more coins in exchange for the same goods and would experience a price increase (shostak-2005 cited in Wikipedia)

Song Dynasty China introduced the practice of printing money to create fiat currency. During the Mongol Yuan Dynasty, the government spent a great deal of money fighting costly wars, and reacted by printing more money, leading to inflation. Fearing the inflation that plagued the Yuan dynasty, the Ming Dynasty initially rejected the use of paper money and reverted to using copper coins. (Benholz-2003 cited in Wikipedia)

Historically, large infusions of gold or silver into an economy also led to the inflation. From the second half of the 15th Century to the first half of the 17th, western Europe experienced a major inflationary cycle referred to as the "price revolution" with prices on average rising six fold over 150 years. The

relationship between the over-supply of bank notes and a resulting depreciation in their value was noted by earlier classical economists, such as David Hume and David Ricardo by examining the effect of currency devaluation on the price of goods. Rapid increase in the money supply have taken place a number of times in countries experiencing political crisis, producing hyperinflations. The hyperinflation in the Weiman Republic of Germany is a notable example and currently Venezuela is facing hyperinflation rate of 833,997% as of October 2018. (Corina, & Ponsj 2018 cited in Wikipedia)

Keynesian economics proposes that in the money supply do not directly affect prices in the short run and that visible inflation is the result of pressures in the economy expressing themselves in the price. The three major types of inflation explained by Robert J. Gordon as triangle model are.

i. Demand pull Inflation:

It is caused by increase in aggregate demand due to increased private and government spending etc. Demand inflation encourages economic growth since the excessive demands and favourable market conditions will stimulate investment and expansion.

ii. Cost-push inflation:

It is also called supply shock inflation. It is caused by a drop in aggregate supply. This may be due to natural disasters or increased prices of input.

iii. Built-in Inflation

Built-in inflation in induced by adaptive expectations and is often linked to the price/wage spiral. It involves workers trying to keep their wages up with prices and firms passing these higher costs on their customers as higher prices leading to a 'vicious circle'. Built-in inflation reflects events in the past, and so might be seen as hangover inflation.

2.1.1 Monetarist View

Monetarists believe the most significant factor inflaming inflation or deflation is how fast the money supply grows or shrinks. They consider fiscal policy, or government spending and taxation, as ineffective in controlling inflation. The monetarist economist Milton Friedman Famously stated "Inflation is always and everywhere a monetary phenomenon. (Friedman, Milton; 1963 cited in Wikipedia)

Monetarists assert that the empirical study of monetary history shows that inflation has always been a monetary phenomenon. The quantity theory of money, simply stated, says that any change in the amount of money in a system will change the price level. This theory begins with the equation of exchange.

$$MV = PQ$$

Where,

M is the nominal quantity of money

V is the velocity of in final expenditures.

P The general price level

Q is an index of the real value of final expenditure.

In this formula, the general price level is related to the level of real economic activity (Q) the quantity of money (M) and the velocity of money (V). The formula is an identity because the velocity of money (V) is defined to be the ratio of final nominal expenditure (PQ) to quantity of money (M). Based on this assumption, the primary driver of the change in the general price level is changes in the quantity of money.

2.1.2 Evolution of Phillips Curve

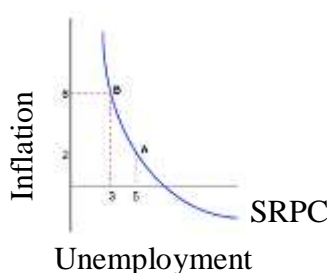
Theoretical and empirical literature on the Phillips curve dates back to the 1950s. The traditional Phillips curve relationship collapsed in the 1970s. Since then, completely new formulations have been advanced to fit empirical evidence. Pioneering work on the Phillips curve relationship is largely attributed

to Phillips(1958). He studied England's wage inflation and unemployment data from the period of 1861 to 1957, through this study, discovered a negative relationship between the variables. Samuelson and Solow (1960) analyzed the relationship between US price inflation and unemployment data for the period 1913 to 1957. The research found the similar relationship between two variables. The model depicting this relationship was named the Phillips curve. Importantly this implied that policy makers had a menu of policy choices. Government could choose to keep inflation low at the expense of high unemployment. Conversely, expansionary monetary policy could be used to achieve low unemployment rate (H. Govera, 2015, P-14).

The Phillips curve relates the role of inflation with the rate of unemployment. The Phillips curve argues that unemployment decreases inflation increases. The relationship, however is not linear, Graphically, the short-run Phillips curve traces an < shape when the unemployment rate is on the X-axis and the inflation rate is on the y-axis (L -candela 2019, P-3)

Figure 2.1

Short run Phillips curve



However economic events of US economy in 1970s undermined the predictions and recommendations of the Phillips curve model as oil shocks resulted high inflation rate on unemployment rate became highest since 1940s.

2.1.3 Friedman's Monetarist Insight

Friedman (1968) argued that the Phillips curve model was miss-specified. He provided a key theoretical insight that in labour markets nominal wages are relatively high in relation to price inflation when excess demand for labour is

large and vice-versa. Friedman reason that monetary policy can only influence unemployment temporarily. But in long run unemployment is in natural rate even in continuous inflation. (Further, kodrzycki, little & olivei, 2009).

2.1.4 Phelps's Contribution

Phelps (1967) used the adaptive expectations framework to derive the accelerationist Phillips curve model. The model posits that unemployment and inflation are independent in the long-run (Govenda 2015, 15)

2.1.5 The New Keynesian Phillips Curve Model (NKPC).

Taylor (1990), Calvo (1983), and Fischer (1997), as discussed by Kiley (1997), argued the short term inflation dynamics are better modelled through price rigidities within the NKPC framework. The NKPC model links price inertia, inflation and changes in the real economy by relating inflation to capacity use or production costs. When prices are sticky, firms may adapt their production and employment levels in tandem with changes in monetary policy. In that way, the theory relates inflation, firms' expectations regarding future inflation, real marginal costs and firms marginal costs. Inflation rises through there are in real marginal costs which firms pass on to consumers translating into higher prices. The associated Phillips curve is negative in the short run. Being micro-founded, NKPC was regarded as theoretically superior and hence was widely allotted. As a result, it became the standard specification in modelling unemployment and inflation dynamics (Duplessis & Burger-2006)

2.1.6 The Neo-Classical Theory:

The neo-classical approach dominates professional thinking about monetary policy. The associated Phillips curve has roots in the work of Phelps (1967), Friedman (1968) & Lucas (1976).

Under the approach, both money and inflation are veils. Expected monetary policy is neutral in both the short and the long runs. The associated Phillips curve is formulated below.

$$\pi = f(u - u^*) + \pi^c$$

where

π^c = expected inflation, u = unemployment rate, π = inflation rate and u^* = natural rate of unemployment (H Govera -2015-19)

2.1.7 Historic Perspective of Inflation in Nepal.

Measurement of prices in Nepal began from 1973 using the expenditure weightage of the goods and services of the people obtained from first HBS. Prior to that equal weights were assigned for each and every commodity of the basket.

The price level and its growth, inflation is an important economic indicator. There are various indices which measure the price level, such as consumer price index (CPI), wholesale price index (WPI), sensitive price index (SPI), gross domestic product (GDP), deflector and so on. In Nepal, there are main three price indices, namely the CPI, the WPI, and the salary and wage rate index (SWRI). The main focus for measuring the cost of living is placed on CPI. This is because CPI measures inflation impact which is the final measure of prices on households. (Nepal Rastra Bank HBSS report 2005/6 (NRB annual report 2007))

In Nepal, the most important categories in the consumer price index are food and beverage (43.91 % of the total weight) and housing, water, electricity, gas and other fuels (20.3%). The index also includes, education (7.4%), clothing and footwear (7.1%), transport (5.3%) furnishing housing equipment (4.3%), healthcare (3.5%), communication (2.8%) miscellaneous goods and services (2.8%) and recreation and culture (2.5%). (RB-Report 2005)

Guruprasad Neupane (2088) In an article of special publication of Nepal Rastra Bank the shortfall in commodity producing sectors, increasing import prices and government budget deficit are important cause of inflation in the country beside the money supply. The continuously increasing government budget

deficit and slow growth of agricultural and industrial production generates inflationary expectations. The finding of this paper suggest that monetary policy is an important instrument to control inflation in Nepal. A policy of increasing money supply in line with the growth of per capita GDP will help to control inflation because growing government budget deficit and financing it from external borrowing helps to increase money supply via increase in net foreign asserts. Growing rate of money supply has thus been found to be inflationary in Nepal.

2.2 Research Review between Inflation and GDP Growth Rate

Wai (1956) in his research paper entitled the relationship between inflation and economic development. A statistical study, has studied the relationship between inflation and economic growth in less developed countries from the time series data over the period of 1938-1954 and had found no relationship between inflation and economic growth.

Fischer (1993) in his research paper entitled the role of macroeconomic factors in growth to explore the correlation between macro economic variables and economic growth using the time series data from 1960-1989 for 101 countries and had found that inflation and economic growth are negatively co-related and inflation hampers economic growth through investment and rate of growth productivity.

Barro (1995) in his research paper entitled Inflation and economic growth, to examine the impact of inflation on economic growth and investment using panel data from 1960 to 1990 for 100 countries and had concluded that inflation has negative and statistically significant effect on economic growth. Investment is the main channel through which inflation reduces economic growth.

Ghosh and Phillips (1998) In IMF paper heading 'Waring: Inflation may be harmful to your growth had studied to investigate whether there is any robust relationship between inflation and economic growth from the panel data from

1960-1996 for 145 countries. They were concluded that statistically and economically significant negative relationship between inflation and economic growth. Positive relationship between the two variables was detected when inflation rate ranged between 2-3 percent or below.

Faria and Carneiro (2001) in an article entitled does the high inflation affect growth in the long and short run had studied by using time series data from 1980-1995 for Brazil and had concluded that there is negative relationship between inflation and economic growth.

Khan and Senhadji (2001) in IMF paper entitled Threshold effects in the relationship between inflation on growth had studied to re-examine the existence of threshold level of inflation above at which inflation harms economic growth using unbalanced panel data 1960-1998 for 140 developed and developing countries and had concluded that threshold level of inflation on above which inflation hurts economic growth is 1-3 percent for industrial developed countries and 11-12 percent for developing countries.

Gokal and Hari (2004) in working paper entitled "Relationship between inflation and economic growth" had studied to access the effect of inflation on economic growth using time series data from 1970 to 2003 for Fiji and had concluded that there is weak negative relationship between inflation and economic growth rate.

Ahmed and Mortaza (2005) in working paper entitled inflation and economic growth in Bangladesh has studied to empirically analyze the relationship between inflation and economic growth using annual data set 1980 to 2005 AD and had concluded that there is statistically significant long run negative relationship between inflation and economic growth rate.

Veni and Choudhury (2007) in entitled 'inflation and economic growth dilemma'. An econometric analysis of the Indian economy had tried to investigate link between inflation and economic growth using Annual time series data from 1981-2004, and had concluded that there is no co-integration

between inflation and economic growth. There is no causality between inflation and economic growth which means that there is autonomous between variables.

Saaed (2007) in entitled 'inflation and economic growth in kuwait 1985-2005' had tried to analyze the inflation growth nexus in Kuwait economy by using time series data 1985-2006 and had found that there is a negative long run and statistically significant correlation between inflation and economic growth.

Chaturved, V etal (2008) in research book entitled inter-relationship between economic growth, saving and inflation in Asia to investigate the interrelationship between economic growth, saving and inflation for south- East and south Asia. Using panel data for 13 Asian countries 1989-2003 are had concluded that inflation has a negative and significant effect an economic growth.

Tabi and Ondoa (2011) in entitled "Inflation, money and economic growth in Cameroon" and studied to explore the association between inflation and economic growth rate using time series data from 1960 to 2007 and had concluded that a rise in money supply promotes economic growth rate and inflation is not a main determinant of economic growth rate.

Datta and Mukhopadhyay (2011) in an economic review entitled 'Relationship between inflation and economic growth in Malaysia' had studied to examine the linkage between inflation and economic growth in Malaysia using annual time series data 1971-2007 there is a short run negative relationship between inflation and economic growth but in the long run the two variables are positively related

Hossain etal (2012) in entitled "Inflation and economic growth in Bangladesh" to investigate the long run relationship between inflation and economic growth rate using annual time series data from 1978-2010 and had concluded that there was no long run correlation between inflation and economic growth.

Salinan&Gopakumar (2013) in entitled "Inflation and economic growth in India. An empirical analysis" had analyze the inflation growth nexus in India using annual time series data 1972-2008 and had concluded that there is long run negative relationship between inflation and economic growth. The sensitivity of growth to changes in inflation rates is lesser than that of inflation to changes in growth rates.

Kasidi&Mwakanemela (2013), in the Journal of empirical research book entitled "Impact of inflation on economic growth; A case study of Tanzania" had studied to examine the impact and existence of relationship between inflation and economic growth in Tanzanian economy casing annual time-series data from 1990-2001 and had found that there is negative impact of inflation on economic growth rate in short period but there is no long ran relationship between inflation and economic growth during the period of the study.

R. Adhikari (2014) In a Journal of Economic entitled whether Inflation Hampers Economic growth in Nepal, had studied about the impact of inflation on economic growth rate by using the data from 1975-2012 and had concluded that inflation has mixed type of impact in economic growth rate. The suspicion of Research Review of relationship between Inflation and employment:

2.3 Research Review of Relationship between Inflation and Employment

Niasken (2001 used the autoregressive distributed lag model to study the Phillips curve relationship the VS - economy from 1960 to 2001 AD. The reseated found a negative short - run relationship. However, no evidence of long- run Phillips curve relationship was found.

Kitov and Kitov (2013) researched inflation, unemployment and labour force dynamics in Japan for the period 1980 -2003. The research used the traditional Phillips curve approach to make long term projections of the variables. The

study found that increasing unemployment resulted in decreasing inflation, supporting the predictions of the Phillips curve in its aright form.

Furuoka (2007) Study inflation and unemployment dynamics in Malaysia for the period 1973-2004. The research confirmed the existence of a long - run trade - off relationship between the two variables. The study found and causal relationship between the two in Malaysia during the same period.

Umarel and Zubairu (2012) empirically researchable the philips curve relationship in Niger from 1977 to 2009. The study used the Engle - Granger co-integration test as well as the ARCH and GARCH techniques for testing volatility. The research didn't find evidence of Phillips sconce relationship in Nigerian for that period.

Tourny (2013) investigated the Phillips course relationship in Egypt between 1974 and 2011 using the VECM. The research used inflation and unemployment data to test the expectations - augmented Phillips curve theory. The research aimed at ascertaining whether inflation containment policy could reduce unemployment in the long ran. The variables were found to be co-integrated with a positive relationship between them.

FuruokaMunir and Harvey (2013) Sought to establish whether the Phillips curve relationship existed in the Philippines during the period 1980-2010. The study employed the dynamic ordinary waste squares (Doks) method and the Hodrick - Prescott filter. The research detected long - run negative and causal correlation between unemployment and inflation in the period under review.

Katria, Bhutto, Butt, Domki, Khawaja and Khalid (2013) researched the nature of the Phillips curve relationship for the period 1980-2010 in 14 countries. Bangladesh, Russia, Nepal, Afghanistan, India, Bhutan, Maldives, Indonesia, south Africa, Sri lanka, Iran, China, Myanmar and Pakistan. The study used the ordinary least square method. The study found negative correlations between inflation and unemployment rate in the countries.

Al-zeand and Al-Hosban (2015) studied the Jordanian economy empirically to learn whether the Phillips curve relationship existed in the period 1976 - 2013. The study employed the vector error correction model as well as linear and non-linear ordinary least squares methods. The research found strong empirical evidence of the Phillips curve in Jordan. The relationship between the two was found to be negative non-linear during the period under study.

2.4 Research Gap

From the theoretical review and research review it is concluded that there is no, universal and concrete or well accepted relation inflation with economic growth rate and unemployment. The researches carried out in different countries and even in same country with different model and time period have different result. The mild inflation of low rate is found to be better for economic growth rate in developing countries but it is not so influencing factor in developed country. According the theoretical view of Phillips curve modified by different economist's shows that there is negative relationship between inflation and unemployment in developing countries.

So, the current study is to examine the relationship between inflation, economic growth rate and unemployment in the prospective of Nepalese economy. This study is differ than other researches in the matter of time series data and objectives and method of study. This study aimed to analyze the trend of inflation in Nepal and its impact in GDP growth rate and reduction of unemployment. In the study data are simply presented using table graph and diagram. The relationship between inflation and unemployment is interpreted by drawing Phillips curve, correlation coefficient and regression equation. But, inflation and economic growth rate is analyzed by correlation - coefficient and regression equation.

CHAPTER 3

METHODOLOGY

Research means to search the problems again and again to find out something more about the problem. Methodology refers the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind it. Thus, research methodology is a way to systematically analyses the logic behind problems so as to find out the conclusion about the problems.

Research methodology directs to the researcher for research design, nature of data, source of data, technique of data collection, universe, sampling etc.

The main objective of this study are to examine the impact of the information in the economic growth rate and unemployment.

An appropriate choice of research methodology is a difficult task, which is very necessary to support the study in realistic term with sound empirical analysis. This study comprises analytical as well as descriptive type.

3.1 Research Design

Quantitative information are collected to observe the trend of inflation, economic growth rate and unemployment in Nepal. The descriptive type of research methodology has been used for the study to make the results more meaningful and useful for the people.

3.2 Population and Data Collection

The population for this study is the total population of Nepal. Data are collected from different governmental and international institutions.

3.3 Nature and Source of Data

This study is based on secondary data covering the period FY 1999/2000 AD to FY 1917/1918. Secondary data obtained from the various published and unpublished sources of government, IMF, World Bank and private organization of different period have been used for the analysis and interpretation of this subject matter under study. For making study more reliable, facts and figures of only authorized organization have been used. Various economic surveys published by Ministry of Finance, GON are used. Similarly, Quarterly Economic Bulletin, occasional paper of Nepal Rastra Bank has been used for getting information world level and South Asian countries, different journals and reports on bulletin published by IMF, W.B. ADB are very much useful.

3.4 Data Collection

The source of data are basically various department and ministries of GON and statistical bulletin published by CBS. Economic survey of 2001/2 to 2017/18 are used to collect the data relation with inflation, economic growth rate and unemployment. To get data related with world and different economic region and South Asian countries are collected from IMF report of various data from 2001 AD April to 2019 April.

3.5 Method of Analysis

This study has been carried out analytical and descriptive design and is based on secondary data. Tabulation trend lines, correlation coefficient regression equation have been used as the tools of analysis on the basis of requirements. Appropriate tables and diagrams are made to clear the objectives of the study. The trend lines are also used to clarify the objective of the study.

3.5.1 Correlation Coefficient (r)

It is a simple statistical tool to find the relationship between two variables. If value of r is 0, there is no any relationship between two variables. If the value is $+1$, there is very high directly proportional relationship between two

variables. If the value is -1 there is very high negative or inverse relationship between two variables.

The word correlation usually express the relationship between two variables. Two variables are said to have 'correlation', when they are so related that the change in the value of one variable is affected by the change in the value of the other correlation is an analysis of the co-variance between two or more variables and it deals to determine the degree of relationship between variables. (D.N. sutihar 2017 p.317). According to croxton and cowdin, when the relationship is of a quantitative nature, the appropriate statistical for discovery and measuring the relationship and expressing it in brief formula is known as correction.

$$\text{Correlation coefficient (r)} = \frac{\Sigma(x-\bar{x})(y-\bar{y})}{\sqrt{\Sigma(x-\bar{x})^2 \Sigma(y-\bar{y})^2}}$$

After getting value of r, if value of r = +1, it shows that there is perfect correlation between the two variables. If value of r = -1, there is negatively perfect correlation between the two variables. When value r = 0, the variables are un-correlated..Nearer the value of r to +1, closer will be the relationship between two variables and nearer the value of r to 0 lesser will be the relationship (Sutihar; 2017, 329).

3.5.2 Regression Equation:

A regression equation of $Y = a + bX$ is a linear equation in which X is a independent variable can be used to state the relationship between Y and X. By solving equation we can find the value of a and b and with the help of a and b we can interpret the result.

Literal meaning of regression is the act of stepping or returning back to the average value. According to M.M. Blair, "Regression analysis is a mathematical measure of the average relationship between two or more variables interms of the original units of data. The regression analysis is used to

describe the average relationship between two variables is known as simple regression analysis. (Sutihar, 2017)

Method of least square

A regression line of y on x where y is dependent variable and x independent variable can be stated in an equation if they are linearly related as,

$$Y = a + bX$$

The estimated value of Y is given by $\hat{Y} = a + b \times \dots$ (i) the error (ie. the difference between observed value of Y and its estimated value of \hat{Y} is given by $e = Y - \hat{Y}$. (ii)/ substituting the value of \hat{Y} in (i) $e = (y - a - bx) \dots \dots$ (ii)

In principle of least square, we have to minimize the sum of squares deviation of observations from the estimated value of Y. We have to square the equation (iii) and taking its summation.

$$\sum e^2 = \sum (Y - \hat{Y})^2 = \sum (Y - a - bx)^2 \dots \dots \text{(iv)}$$

For minimization setting its first order partial derivative is zero.

Taking partial derivation of (iv) w.r.t a and setting it equal to zero.

$$\frac{d(\sum e^2)}{da} = \frac{d\sum (Y - a - bX)^2}{d(Y - a - bX)} \cdot \frac{d(Y - a - bX)}{da} = 0$$

$$\text{or } 2\sum (Y - a - bX) (-1) = 0$$

$$\text{or } -2\sum (Y - a - bX) = 0$$

$$\text{or } \sum Y - na - b\sum X = 0$$

$$\text{or } \sum Y = na + b\sum X \dots \dots \text{(v)}$$

Similarly, taking partial derivative of (iv) w.r.t.b and setting it equal to zero.

$$\frac{d(\sum e^2)}{db} = \frac{d(d\sum (Y - a - bX)^2)}{db}$$

$$= \frac{d\sum (Y - a - bX)^2}{d(Y - a - bX)} \cdot \frac{d(Y - a - bX)}{db} = 0$$

$$\text{or } 2\sum (Y - a - bX) (-X) = 0$$

$$\text{or } -2\sum (Y - a - bX) (X) = 0$$

$$\text{or } \sum XY - a\sum X - b\sum X^2 = 0$$

$$\text{or } \sum XY = a\sum X + b\sum X^2 \dots\dots \text{(vi)}$$

Thus two equations (v) and (vi) are normal equations which are used to estimate the values of a and b.

$$\text{As we have } \sum Y = na + b \sum X \dots \text{(v)}$$

$$\sum XY = a\sum X + b\sum X^2 \dots\dots \text{(vi)}$$

Matrix method:

Putting in matrix from the solve the equations (v) and vi)

$$\begin{bmatrix} \sum Y \\ \sum XY \end{bmatrix} = \begin{bmatrix} n & \sum X \\ \sum X & \sum X^2 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix}$$

$$\begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} n & \sum X \\ \sum X & \sum X^2 \end{bmatrix}^{-1} \begin{bmatrix} \sum Y \\ \sum XY \end{bmatrix} \dots\dots \text{(vii)}$$

$$\text{ora} = A^{-1} \beta \dots\dots\dots \text{(viii)}$$

$$\text{we have, } A = \begin{bmatrix} n & \sum X \\ \sum X & \sum X^2 \end{bmatrix}$$

$$\text{then, } |A| = n\sum X^2 - (\sum X)^2$$

$$\text{Matrix of co=factor} = C = \begin{bmatrix} \sum X^2 & -\sum X \\ -\sum X & n \end{bmatrix}$$

$$\text{Adjoint matrix of } A = C^T = [\text{adj } A] = \begin{bmatrix} \sum X^2 & -\sum X \\ -\sum X & n \end{bmatrix}$$

$$\text{We have, } A^{-1} = \frac{1}{|A|} (\text{adj of } A)$$

$$= \frac{1}{n\sum X^2 - (\sum X)^2} \begin{bmatrix} \sum X^2 & -\sum X \\ -\sum X & n \end{bmatrix} \begin{bmatrix} \sum Y \\ \sum XY \end{bmatrix}$$

$$\text{or } a = \frac{\sum X^2 \sum Y - \sum X \sum XY}{n \sum X^2 - (\sum X)^2}$$

$$b = \frac{-\sum X \sum Y + n \sum XY}{n \sum X^2 - (\sum X)^2}$$

$\sum X$, $\sum Y$, $\sum X^2$ and $\sum XY$ can be obtained by the observed value. When we put the value of n, $\sum X$, $\sum Y$, $\sum X^2$ and $\sum XY$, we get value of a and b.

Substituting the value of a and b in equation (i)

we get, $\hat{Y} = a+bX$, where a and b are known as regression parameters.

- a is the intercept made by the regression line on y-axis, which represent the mean value of Y and X is zero.

-b is the regression coefficient which gives the slope of regression line. It indicates the rate of change in Y due to per unit change in X.

In this research, Inflation (I) is considered as a independent variable and GDP growth rate (G) and unemployment rate (U) are as a dependent variables.

Then, regression parameters a and b in the relation GDP growth rate based on inflation are obtained as,

$$a = \frac{\sum I^2 \sum G - \sum I \sum IG}{n \sum I^2 - (\sum I)^2}$$

$$\text{and } b = \frac{-\sum I \sum G + n \sum IG}{n \sum I^2 - (\sum I)^2}$$

Similarly,

Regression parameters a and b can be obtained in the relation unemployment on inflation can be obtained as,

$$a = \frac{\sum I^2 \sum u - \sum I \sum IU}{n \sum I^2 - (\sum I)^2}$$

$$\text{or } b = \frac{-\sum I \sum U + n \sum IU}{n \sum I^2 - (\sum I)^2}$$

By interpreting the value of a and b we can understand make conclusion on impart of inflation on economic growth rate and unemployment rate.

3.5.3 Elasticity

In regression analysis, elasticities means the proportionate change in one variable caused by a proportionate change in other variable.

i) Let the relationship between inflation and economic growth rate be

$$G = a + bI \dots\dots\dots (i)$$

why $G =$ Economic growth rate

$I =$ Inflation rate

Then,

The inflation elasticity of economic growth rate is defined by

$$\text{Elasticity of inflation: } (eI) = \frac{\text{proportionate change in economic growth rate}}{\text{proportionate change in Inflation rate}}$$

$$= \frac{\frac{\Delta G}{G}}{\frac{\Delta I}{I}}$$

$$= \frac{dG}{dI} \cdot \frac{I}{G} \dots\dots\dots (i)$$

Differentiates the regression equation (i) with respect to I.

we get, $\frac{dG}{dI} = b$.

Hence, the average inflation elasticity of economic growth rate is expressed as,

$$eI = b \cdot \frac{\bar{I}}{\bar{G}}$$

Similarly, the average inflation elasticity of unemployment is expressed as

$$eI = b \frac{\bar{I}}{\bar{U}}$$

CHAPTER 4

DATA ANALYSIS

4.1 World Wide Situation of Inflation

Every year IMF publishes the report to show the macroeconomic indicators of world and different country. Inflation rate is calculated based on rise in commodity prices including rise in energy prices.

Table 4.1
Global Inflation Rate

Economy	2014	2015	2016	2017	2018
Advance economics	1.4	0.3	0.8	1.7	2
Emerging and Developing economics	4.7	4.7	4.3	4.0	4.6
Emerging and developing Asia	3.4	2.7	2.8	2.4	3.3
Emerging and developing Europe	4.1	3.2	3.2	6.2	6.8
Middle East and North African countries	6.5	5.8	4.9	6.6	8.7
Low Income developing economics	7.2	7.4	8.7	9.5	9.3

Source: IMF Report 2019 April.

From the table 4.1, it is clear that inflation rate in developed economics is comparatively lower than that developing economics. Inflation of rate of low income developing economics is 9.3% in 2018 AD. Inflation of developed economics is only 2%.

In South Asian countries, inflation rate of Nepal, India, Bangladesh, Afghanistan and Pakistan is consistently higher where as inflation rate of Sri Lanka and Maldives is comparatively lower. Inflation rate of Bhutan is continuously decreasing. In 2018 inflation rate of Pakistan is maximum and inflation rate of Maldives was minimum. Inflation rate of Nepal in 2018 is 42%.

Table 4.2

Trend of inflation in south Asia and China

Countries	2014	2015	2016	2017	2018
Bangladesh	7.0	6.2	5.7	5.7	5.5
Bhutan	9.9	6.3	3.9	3.4	2.7
India	5.8	4.9	4.5	3.6	4.9
Maldives	2.1	1.0	0.5	2.8	0.1
Nepal	9.0	7.2	9.9	4.5	4.2
Sir Lanka	2.8	2.2	4.0	6.5	2.1
Afghanistan	4.7	-0.7	4.4	5.0	5.0
Pakistan	8.6	4.5	2.9	4.1	5.19
China	2.0	1.4	2.0	1.6	2.1

Source: IMF Report 2019 April

4.2 World Wide Situation of Economic Growth Rate

From the table 4.3, the economic growth rate of world is 3% to 4% in recent years. In 2018 AD, economic growth rate of world is 3.9%, economic growth rate of advanced economics is 2.5%, emerging and developing economics is 4.9%, low income developing economics is 5.0%. Economic growth rate of emerging and developing Asia is 6.5%.

Table 4.3
World Economic Growth Rate (In %)

Economy	2014	2015	2016	2017	2018
World Economy	3.6	3.5	3.2	3.8	3.9
Advanced economy	2.1	2.3	1.7	2.3	2.5
Emerging and Developing Economics	4.7	4.3	4.4	4.8	4.9
Emerging and Developing Asia	6.8	6.8	6.5	6.5	6.5
Middle East and North African Countries	2.6	2.4	4.9	2.2	3.2
European Union countries	1.8	2.4	2.0	2.7	2.5
Lower income developing economics	6.0	4.9	3.5	4.7	5.0
Emerging and developing Europe	3.9	4.7	3.2	5.8	4.3

Source: IMF Report 2019 April

Table 4.4
Economic Growth Rate of South Asian Countries and China. (in Percent)

Countries	2014	2015	2016	2017	2018
Bangladesh	6.3	6.8	7.2	7.1	7.0
Bhutan	4.0	6.1	6.3	6.0	7.1
India	7.5	8.2	7.1	6.7	7.4
Maldives	7.6	2.2	4.5	4.8	5.0
Nepal	6.0	3.2	0.4	7.5	6.7
Sri Lanka	5.0	5.0	4.5	3.1	4.0
Pakistan	4.1	4.1	4.5	5.3	5.6
Afghanistan	2.7	1.3	2.4	2.5	2.5
China	7.3	6.9	6.7	6.9	6.6

Source: *IMF Report 2019 April*

Table 4.4 shows that economic growth rate in south Asian countries is comparatively high. In 2018 AD, economic growth rate of India is 7.4

maximum and lowest is 2.5 percent of Afghanistan. Economic growth rate of Nepal is 6.7 percent. Economic growth rate of Bangladesh and India is consistently high in last five years, whereas economic growth rate of Afghanistan is constantly low.

4.3 Inflation and Economic Growth Rate

In the context of Nepal inflation is consistently high when as economic growth rate is below than desirable rate. The average inflation rate in Nepal from 1990 to 2018 AD is 7.5875 and average economic growth rate is 4.5090. The maximum inflation rate is 17.15 percent in 1992 AD and minimum inflation rate is 2.27 percent in 2007 AD. The maximum economic growth rate is 8.22 percent in 1994 AD and minimum growth rate is 0.59 percent in 2016 AD.

Figure: 4.1

Inflation and Economic Growth Rate

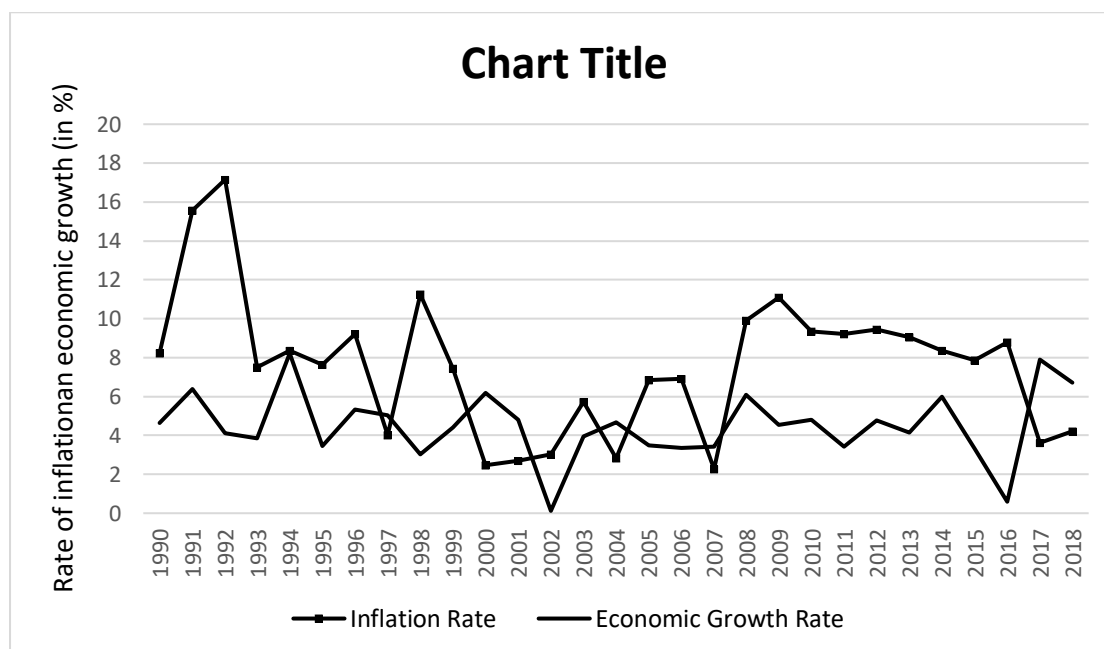


Table 4.5

Relationship between inflation and economic growth rate

Year	Inflation	Economic Growth Rate
2018	4.2	6.7
2017	3.63	7.91
2016	8.79	0.59
2015	7.87	3.32
2014	8.36	5.99
2013	9.04	4.13
2012	9.46	4.78
2011	9.23	3.42
2010	9.33	4.82
2009	11.09	4.53
2008	9.91	6.1
2007	2.27	3.41
2006	6.92	3.36
2005	6.84	3.48
2004	2.84	4.68
2003	5.71	3.95
2002	3.03	0.12
2001	2.69	4.8
2000	2.48	6.2
1999	7.45	4.41
1998	11.24	3.02
1997	4.01	5.05
1996	9.22	5.33
1995	7.63	3.47
1994	8.35	8.22
1993	7.51	3.85
1992	17.15	4.11
1991	15.56	6.37
1990	8.24	4.64
Total	220.05	130.76
Average	7.5879	4.5089

Source: World Bank Report 2019 available in ceic.com

4.3.1 Relationship between Inflation and Economic Growth Rate.

To examine the relationship between inflation and economic growth rate, value of correlation coefficient is calculated. From appendix A, value of correlation coefficient has been found as 0.000154.

The value of correlation coefficient between inflation and economic growth rate in the time series data from 1990 to 2018, is 0.000154. It is almost zero. So, it shows that there is no significant relationship between inflation and economic growth rate in Nepal. It shows that economists and policy makers of Nepal should not use inflation as a influencing factor of economic growth rate.

4.3.2 t-Test to examine relationship between inflation rate and unemployment rate

Co-rrrelation coefficient (r) = -0.000000679

$$\begin{aligned}\text{Value of } t &= \frac{r}{\sqrt{1-r^2}} \times \sqrt{n-2} \\ &= \frac{-0.000000679}{\sqrt{1-(0.000000679)^2}} \times \sqrt{27} \\ &= -0.00001833\end{aligned}$$

The tabulated value of t for 5 percent level of significance and 27 degree of freedom is 1.703. The calculated value is less then tabulated value. So, null hypothesis is accepted. It means that there is no significant relationship between inflation and unemployment rate.

4.3.2 Impact of Inflation on Economic Growth Rate

To understand and examine the impact of inflation on economic growth rate, regression line is used, In the Linear regression line, inflation is considered as a independent father and economic growth rate as a dependent variable The regression equation of economic growth rate (G) on dependent variable inflation (I) is obtained as,

Linear regression line of economic growth rate on dependent variable inflation rate (I) is written as,

$$G = a + b I$$

Where,

G = Economic growth rate

I = Inflation rate

a = Y intercept or value of G when I = 0 percent

b = slope of regression line which shows the change in value of G in percent change is value of I.

When value of a and b from appendix B are put in the equation of $G = a + bI$, it forms

$$G = 4.4437 - 0.008597 I$$

For the above regression line, it is clear that economic growth rate is slightly negatively dependent with inflation rate. When, Inflation rate is 1%, Economic growth rate is decrease by 0.008597%. But when inflation is 0%, economic growth rate is 4.4437%. It shows that, inflation has very-very less influential effect on economic growth rate. And inflation has no any positive role to create economic growth rate.

4.4 Inflation and Unemployment

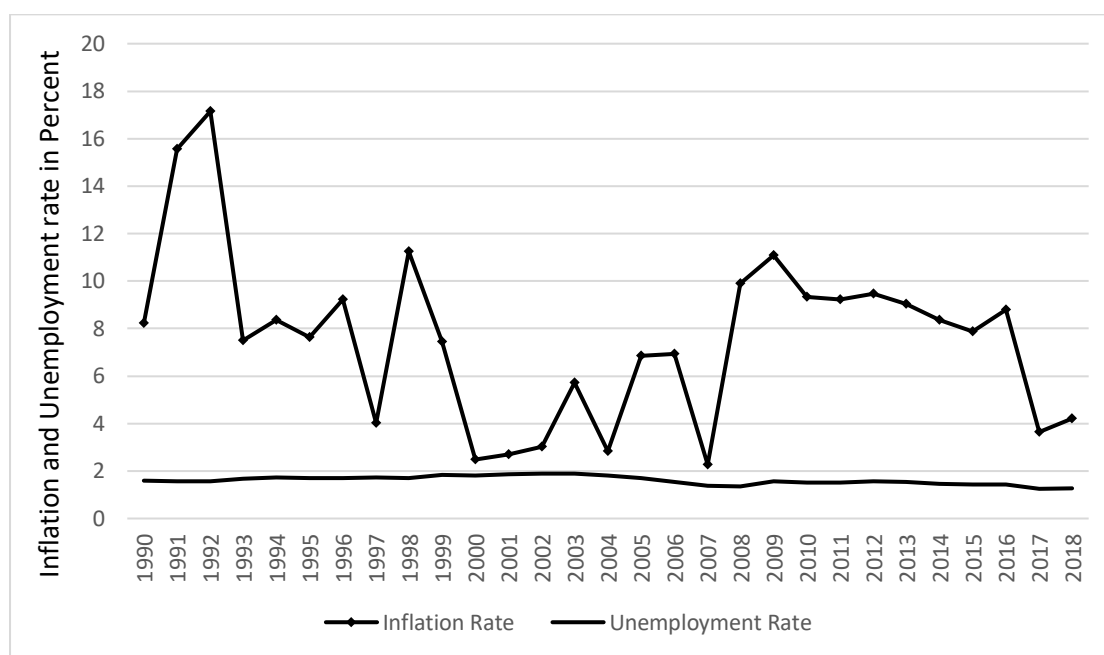
Unemployment is the most influential macro-economic indicator. Inflation and un-employment both are negative for well economy. The trend of un-employment in Nepal from 1990 to 2018 is tabulated below.

Table 4.6
Inflation and un-employment

Year	Inflation (I) (in percent)	Unemployment (U) (in percent)
2018	4.2	1.26
2017	3.63	1.25
2016	8.79	1.43
2015	7.87	1.43
2014	8.36	1.46
2013	9.04	1.55
2012	9.46	1.58
2011	9.23	1.52
2010	9.33	1.52
2009	11.09	1.57
2008	9.91	1.34
2007	2.27	1.38
2006	6.92	1.55
2005	6.84	1.71
2004	2.84	1.8
2003	5.71	1.89
2002	3.03	1.88
2001	2.69	1.86
2000	2.48	1.82
1999	7.45	1.85
1998	11.24	1.71
1997	4.01	1.73
1996	9.22	1.7
1995	7.63	1.7
1994	8.35	1.74
1993	7.51	1.68
1992	17.15	1.57
1991	15.56	1.58
1990	8.24	1.6
Total	220.05	46.66
Average	7.5879	1.6089

Source: World Bank Report 2019

Figure 4.2
Inflation and Unemployment Rate In



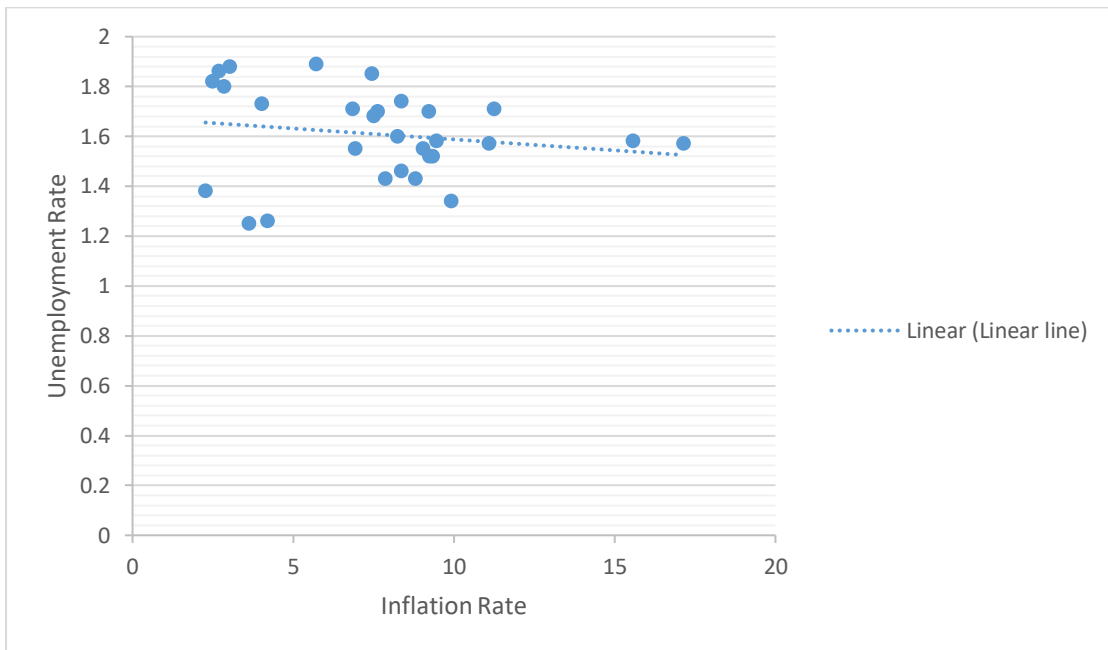
From the table 4.6, it is clear that in the study period average Inflation rate is 7.58% and average unemployment rate is 1.5090%. Inflation rate is 17.15% maximum in 1992 AD and it is 2.27% minimum in 2007 AD. Table shows that inflation rate and unemployment rate are consistent. Inflation rate is high and unemployment rate is low. The average economic growth rate in study period is 7.5879 and average unemployment rate is 1.6089. Very low unemployment rate may be due to foreign employment.

Phillips curve:

To examine Phillips curves value of inflation and unemployment are plotted in x-axis and y-axis, Inflation is kept in x-axis and unemployment rate is kept in y-axis. From the figure 4.3, it is clear that relationship between inflation rate and unemployment rate is not significant. The linear line of unemployment on inflation rate $[U=a+bI]$ is slightly downward sloping and it shows, that inflation slightly decreases unemployment rate.

Figure 4.3

Phillips curve to show the relationship between inflation and unemployment.



4.4.1 Relationship between Inflation and Unemployment

To examine the relationship between inflation and unemployment rate correlation coefficient is used. The correlation coefficient between inflation and unemployment is calculated as,

Value of correlation coefficient between inflation and unemployment is 0.000000679. It is very-very close to zero. It shows that there is no any relationship between inflation and unemployment.

4.4.2 t-Test to Examine Relationship between Inflation and Unemployment

Value of co-rrrelation coefficient (r) = 0.000154

$$\begin{aligned}
 \text{Value of } t &= \frac{r}{\sqrt{1-r^2}} \times \sqrt{n-2} \\
 &= \frac{0.000154}{\sqrt{1-(0.000154)^2}} \times \sqrt{27} \\
 &= 0.000415
 \end{aligned}$$

The tabulated value of t in 5 percent level of significance and 27 degree of freedom is 1.703 so, H_0 is accepted. It shows that there is no significant relationship between inflation and unemployment rate.

4.4.3 Impact of Inflation on Unemployment Rate

To examine the impact of inflation on unemployment a regression equation of unemployment on dependent variable inflation (I) is obtained as $U = a + bI$. In which, a and b are parameters and value of a indicates that rate of unemployment when inflation rate is 0% and b is slope of regression line and it shows the change in unemployment rate when inflation rate change by 1%. From the appendix D, value of a is 1.67436 and value of b is -0.008668. And regression line can be written as,

$$U = 1.67436 - 0.008668 I$$

When, Inflation is 0 percent, then average unemployment rate is 1.67436 percent and when Inflation rate is 1 percent, Unemployment rate is decreases by 0.008668 percent. It shows that inflation has negative impact on unemployment. When inflation rate increases unemployment rate decreases. Even though. Inflation has very mild effect to decreases unemployment it satisfies the theme and theory of Philips curve.

4.4.4 Elasticity

From Appendix D, the average inflation elasticity of economic growth rate expressed as $eI = b \frac{\bar{I}}{\bar{G}}$

$$\begin{aligned} &= -0.008597 \times \frac{7.5879}{4.5089} \\ &= -0.01446 \end{aligned}$$

It implies that if inflation changes by 1 percent, economic growth changes by 0.01446 percent. Since $|eI| < 1$ it shows that economic growth is relatively inelastic with inflation.

The average inflation elasticity of unemployment is obtained as

$$\begin{aligned} eI &= b \frac{\bar{I}}{\bar{U}} \\ &= -0.008668 \times \frac{7.5879}{1.6089} \\ &= -0.04088 \end{aligned}$$

Value $eI = -0.4088$ shows that if inflation changes by 1 percent unemployment changes by 0.04088 percent. Since $|eI| < 1$ it shows that unemployment is very less elastic with inflation.

4.5 Major Findings

The major findings of the study are listed below.

- i. The average inflation rate from 1990 to 2018 is 7.8576 percent.
- ii. The average economic growth rate from 1990 to 2018 AD is 4.5090 percent.
- iii. The average unemployment rate is 1.6090 percent.
- iv. The inflation rate is 17.15 percent maximum in 1992 and 2.27 percent minimum in 2007.
- v. The economic growth rate is 8.22 percent maximum in 1994 and 0.59 percent minimum in 2016.
- vi. The unemployment rate is 1.89 percent maximum in 2003 and 1.26 percent minimum in 2018 AD.
- vii. The correlation coefficient between inflation and economic growth rate is 0.000154. It means that inflation has no any significant impact on economic growth rate. And inflation and economic growth rate can be considered as independent variables of the economy.
- viii. The regression line of economic growth rate with independent variable inflation (I) has been obtained as $G = 4.4437 - 0.008597 I$. It shows that when there is no inflation, economic growth rate is 4.4437% and when inflation rate is 1%, economic growth rate decrease by 0.008597 percent.

- ix. The correlation coefficient between inflation and unemployment is 0.000000679. It shows that inflation and unemployment are very much less related with each other. Inflation has no significant influence on unemployment.
- x. The regression line of unemployment on inflation is $U = 1.67436 - 0.008668 I$. It shows that when there is no inflation, the unemployment rate is 1.67436 and when inflation is 1% unemployment rate decreases by 0.008668%. It shows that inflation has very less negative impact on unemployment.

CHAPTER 5

SUMMARY AND CONCLUSIONS

5.1 Summary

Inflation is the most current issue of macroeconomics of Nepal. More than 21% of Nepalese people are under the poverty line and average yearly income is hardly \$1000. Price rate of commodities is prime concern of Nepalese people, politician and government. The main objective of this study was to examine the trend of inflation and its impact on two most preferable macroeconomic indicators of economy; economic growth rate and unemployment.

The whole study has divided into five chapters, first chapters has given the introduction about the research topic, statement of problems, objectives of the study and limitation of the study. Second chapter is literature review in which different related book; articles have been reviewed in the significant way. The third chapter is meant for research methodology. Descriptive type of research design has been adapted to analyze the facts and figures obtained from different sources. To examine the impact of inflation on economic growth rate and unemployment rate correlation coefficient and regression lines are used. To obtain regression line matrix method is used.

The inflation rate of advanced economics in the last five years is in the range of 0.3% to 2% and that of low income developing countries is in the range of 7.2% to 9.5%. In south Asia, inflation rate of Maldives and Sri Lanka is lower, Bhutan's inflation rate is decreasing. But inflation rate of Nepal is in the range of 4.2% to 9% in last five years.

In last five years, world economy is expanded by more than 3% Economic growth rate of world in 2018 is 3.9%. In South Asia, economic growth rate of India and Bangladesh is comparatively high. Economic growth rate of Afghanistan is lower than other South Asian countries. The economic growth rate of Nepal in 2018 is 6.7%, 2018 is 7.5%, in 2016 is 0.59%.

The unemployment rate of Nepal is comparatively lower. According to WB report updated in 2019 April, unemployment rate of Nepal is less than 2%. It is very low and it may be due to very high foreign employment rate.

The average inflation rate from 1990 to 2018 is 7.8576. The average economic growth rate from 1990 to 2018 AD is 4.5090. The average unemployment rate is 1.6090. The inflation rate is 17.15% maximum in 1992 AD and 2.27 minimum in 2007 AD. The economic growth rate is 8.22% maximum in 1994 AD and 0.59% minimum in 2016 AD. The unemployment rate is 1.89 maximum in 2003 AD and 1.26 minimum in 2018 AD.

The correlation coefficient between inflation and economic growth rate is 0.000154. It means that inflation has no any significant impact on economic growth rate. And inflation and economic growth rate can be considered as independent variables of the economy. The regression line of economic growth rate with dependent variable inflation (I) is obtained as $G = 4.4437 - 0.008597 I$. It shows that when there is no inflation, economic growth rate is 4.4437% and when inflation rate is 1%, economic growth rate decrease by 0.008597%.

The correlation coefficient between inflation and unemployment is 0.000000679. It shows that inflation and unemployment are very much less related with each other. Inflation has no significant influence on unemployment. The regression line of unemployment in inflation is $U = 1.67436 - 0.008668 I$. It shows that when there is no inflation, the unemployment rate is 1.67436 and when inflation is 1% unemployment rate decreases by 0.008668%. It shows that inflation has very less negative impact on unemployment.

5.2 Conclusions

Macroeconomic policy aims to promote economic growth, employment creation and control of inflation. There is considerable debate on how inflation affects to the economic growth rate and employment creation. As monetary policy aims to control inflation with economic growth and controlling

unemployment, but it does not give a satisfactory result. From different researches, it is suggested that mild or low inflation rate is useful for developing countries like Nepal. But hyper inflation rate is bad for both developed and developing economies.

To analyze the relationship between inflation and economic growth rate, correlation coefficient and regression line are used. The value of correlation coefficient between inflation and economic growth rate is found 0.000154. It shows there is negligible relationship between inflation and economic growth rate. Similarly, the regression line of growth rate $G = 4.4437 - 0.008597 I$. It clarifies that economic growth rate is 4.4437% when there is 0% inflation rate and economic growth rate decreases by 0.008597% when inflation is 1%. It shows that inflation has no significant impact on economic growth rate. The policy makers should not consider inflation as a macroeconomic tool to promote economic growth.

To analyze the impact of inflation on unemployment, correlation coefficient and regression line are used. The value of correlation coefficient is 0.000000679. It shows that inflation and unemployment are almost free from each other. Inflation has no influence in job creation and to decrease unemployment. The regression line of unemployment based on inflation $U = 1.67436 - 0.008668I$. From this, it is concluded that in 0% inflation rate, the average unemployment rate is 1.67436. And when inflation rate is 1% unemployment rate decreases by 0.008668%. So, inflation has very less impact on both economic growth rate and employment creation.

5.3 Suggestions

The following suggestions have been made which would help the concerned authorities to take necessary steps to overcome the problems of inflation and its impact.

1. Though inflation is considered as a macroeconomic tool to overcome the problem of unemployment in many developing countries, but, it is found

completely useless in the context of Nepal. In contrary, it decreases wealth of people, deposited in the bank and unbelievable atmosphere to bond buyers, depositors and investors. So, in monetary policy, should aim to control inflation.

2. Inflation also does not contribute to economic growth. So view of mild inflation is good for economy is totally wrong in the context of Nepal. The inflation rate higher than economic growth rate is exploitation the whole economy. So concerned authorities needs to make plan and policy to control inflation.

APPENDIX

Appendix A

Calculation of relationship between inflation and economic growth rate

Year	I	G	$i-I\bar{I}$	$g-G\bar{G}$	i^2	g^2	$i \times g$
2018	4.2	6.	-3.387	2.29	11.47583	5.24868	-7.76099
2017	3.63	7.9	-3.957	3.50	15.66259	12.25700	-13.8555
2016	8.79	0.5	1.202	-3.81	1.445765	14.58476	-4.59196
2015	7.87	3.3	0.282	-1.08	0.079749	1.18592	-0.30753
2014	8.36	5.9	0.772	1.58	0.596601	2.49956	1.221164
2013	9.04	4.1	1.452	-0.27	2.109465	0.07784	-0.4052
2012	9.46	4.7	1.872	0.37	3.505881	0.13764	0.694660
2011	9.23	3.4	1.642	-0.98	2.697477	0.97812	-1.62433
2010	9.33	4.8	1.742	0.41	3.035957	0.16892	0.716126
2009	11.09	4.5	3.502	0.12	12.26680	0.01464	0.423790
2008	9.91	6.	2.322	1.69	5.393541	2.85948	3.927178
2007	2.27	3.4	-5.317	-0.99	28.2768	0.99800	5.312282
2006	6.92	3.3	-0.667	-1.04	0.445689	1.10040	0.700312
2005	6.84	3.4	-0.747	-0.92	0.558905	0.86304	0.694520
2004	2.84	4.6	-4.747	0.27	22.53970	0.07344	-1.286
2003	5.71	3.9	-1.877	-0.45	3.525381	0.21068	0.861818
2002	3.03	0.1	-4.557	-4.28	20.77171	18.39552	19.54754
2001	2.69	4.	-4.897	0.39	23.98648	0.15288	-1.91496
2000	2.48	6.	-5.107	1.79	26.08757	3.20768	-9.14771
1999	7.45	4.4	-0.137	0.00	0.018933	1E-0	-0.00013
1998	11.24	3.0	3.652	-1.38	13.34002	1.92932	-5.07318
1997	4.01	5.0	-3.577	0.64	12.79922	0.41088	-2.29324
1996	9.22	5.3	1.632	0.92	2.664729	0.84824	1.503440
1995	7.63	3.4	0.042	-0.93	0.001797	0.88172	-0.03981
1994	8.35	8.2	0.762	3.81	0.581253	14.52372	2.905506
1993	7.51	3.8	-0.077	-0.55	0.006021	0.31248	0.043378
1992	17.15	4.1	9.562	-0.29	91.43949	0.08940	-2.85915
1991	15.56	6.3	7.972	1.96	63.55916	3.84552	15.63387
1990	8.24	4.6	0.652	0.23	0.425625	0.05336	0.150704
Total	220.05	130.7	0.009	2.89	369.2982	87.90886	3.175897

Correlation coefficient between inflation rate and economic growth rate.

$$\begin{aligned}r &= \frac{\Sigma (I-\bar{I}) \cdot (U-\bar{U})}{\sqrt{\Sigma(I-\bar{I})^2 \Sigma(G-\bar{G})^2}} \\&= \frac{\Sigma I \cdot \Sigma g}{\sqrt{\Sigma i^2 \cdot \Sigma g^2}} \\&= \frac{0.0096 \times 2.899}{\sqrt{369.2983 \times 87.908869}} \\&= \frac{0.0278304}{\sqrt{32,464.594118}} \\&= \frac{0.0278304}{180.17937} \\r &= 0.000154\end{aligned}$$

Appendix B

Calculation of impact of inflation on economic growth rate.

Year	I	G	I ²	I×G
2018	4.2	6.7	17.64	28.14
2017	3.63	7.91	13.1769	28.7133
2016	8.79	0.59	77.2641	5.1861
2015	7.87	3.32	61.9369	26.1284
2014	8.36	5.99	69.8896	50.0764
2013	9.04	4.13	81.7216	37.3352
2012	9.46	4.78	89.4916	45.2188
2011	9.23	3.42	85.1929	31.5666
2010	9.33	4.82	87.0489	44.9706
2009	11.09	4.53	122.9881	50.2377
2008	9.91	6.1	98.2081	60.451
2007	2.27	3.41	5.1529	7.7407
2006	6.92	3.36	47.8864	23.2512
2005	6.84	3.48	46.7856	23.8032
2004	2.84	4.68	8.0656	13.2912
2003	5.71	3.95	32.6041	22.5545
2002	3.03	0.12	9.1809	0.3636
2001	2.69	4.8	7.2361	12.912
2000	2.48	6.2	6.1504	15.376
1999	7.45	4.41	55.5025	32.8545
1998	11.24	3.02	126.3376	33.9448
1997	4.01	5.05	16.0801	20.2505
1996	9.22	5.33	85.0084	49.1426
1995	7.63	3.47	58.2169	26.4761
1994	8.35	8.22	69.7225	68.637
1993	7.51	3.85	56.4001	28.9135
1992	17.15	4.11	294.1225	70.4865
1991	15.56	6.37	242.1136	99.1172
1990	8.24	4.64	67.8976	38.2336
Total	220.05	130.76	2039.023	995.3728

Value of a and b are obtained as,

$$\begin{aligned} a &= \frac{\sum i^2 \cdot \Sigma G - \Sigma I \Sigma IG}{n \times \Sigma I^2 - (\Sigma I)^2} \\ &= \frac{2039.023 \times 130.76 - 220.05 \times 995.3728}{29 \times 2039.023 - (220.05)^2} \\ &= \frac{266,622.64748 - 219031.7846}{59131.667 - 48422.0025} \\ &= \frac{47590.86288}{10,709.6645} \\ &= 4.4437 \end{aligned}$$

Again

$$\begin{aligned} b &= \frac{-\Sigma I \Sigma G + n \Sigma IG}{n \times \Sigma I^2 - (\Sigma I)^2} \\ &= \frac{-220.05 \times 130.76 + 29 \times 995.3728}{29 \times 2039.023 - (220.05)^2} \\ &= \frac{28,773.738 - 28,865.8112}{59131.667 - 48422.0025} \\ &= \frac{-92.0732}{10,709.6645} \\ &= -0.008597 \end{aligned}$$

When value of a and b are put in the equation of $G = a + bI$, it forms

$$G = 4.4437 - 0.008597 I$$

Appendix C

Calculation of relationship between inflation and unemployment

Year	I	U	$i = I - \bar{I}$	$u = U - \bar{U}$	i^2	u^2	$i \times u$
2018	4.2	1.26	-3.3875	-0.349	11.47516	0.121801	1.182238
2017	3.63	1.25	-3.9575	-0.359	15.66181	0.128881	1.420743
2016	8.79	1.43	1.2025	-0.179	1.446006	0.032041	-0.21525
2015	7.87	1.43	0.2825	-0.179	0.079806	0.032041	-0.05057
2014	8.36	1.46	0.7725	-0.149	0.596756	0.022201	-0.1151
2013	9.04	1.55	1.4525	-0.059	2.109756	0.003481	-0.0857
2012	9.46	1.58	1.8725	-0.029	3.506256	0.000841	-0.0543
2011	9.23	1.52	1.6425	-0.089	2.697806	0.007921	-0.14618
2010	9.33	1.52	1.7425	-0.089	3.036306	0.007921	-0.15508
2009	11.09	1.57	3.5025	-0.039	12.26751	0.001521	-0.1366
2008	9.91	1.34	2.3225	-0.269	5.394006	0.072361	-0.62475
2007	2.27	1.38	-5.3175	-0.229	28.27581	0.052441	1.217708
2006	6.92	1.55	-0.6675	-0.059	0.445556	0.003481	0.039383
2005	6.84	1.71	-0.7475	0.101	0.558756	0.010201	-0.0755
2004	2.84	1.8	-4.7475	0.191	22.53876	0.036481	-0.90677
2003	5.71	1.89	-1.8775	0.281	3.525006	0.078961	-0.52758
2002	3.03	1.88	-4.5575	0.271	20.77081	0.073441	-1.23508
2001	2.69	1.86	-4.8975	0.251	23.98551	0.063001	-1.22927
2000	2.48	1.82	-5.1075	0.211	26.08656	0.044521	-1.07768
1999	7.45	1.85	-0.1375	0.241	0.018906	0.058081	-0.03314
1998	11.24	1.71	3.6525	0.101	13.34076	0.010201	0.368903
1997	4.01	1.73	-3.5775	0.121	12.79851	0.014641	-0.43288
1996	9.22	1.7	1.6325	0.091	2.665056	0.008281	0.148558
1995	7.63	1.7	0.0425	0.091	0.001806	0.008281	0.003867
1994	8.35	1.74	0.7625	0.131	0.581406	0.017161	0.099887
1993	7.51	1.68	-0.0775	0.071	0.006006	0.005041	-0.0055
1992	17.15	1.57	9.5625	-0.039	91.44141	0.001521	-0.37294
1991	15.56	1.58	7.9725	-0.029	63.56076	0.000841	-0.2312
1990	8.24	1.6	0.6525	-0.009	0.425756	8.1E-05	-0.00587
Total	220.05	46.66	0.0125	-0.001	369.2983	0.917669	-3.23566

$$\begin{aligned}\text{Correlation coefficient (r)} &= \frac{\Sigma(I-\bar{I}) \times \Sigma(U-\bar{U})}{\sqrt{\Sigma(I-\bar{I})^2 \Sigma(U-\bar{U})^2}} \\ &= \frac{0.0125 \times (-0.001)}{\sqrt{(369.2983) \times 0.917669}} \\ &= \frac{-0.0000125}{18.4090} \\ &= -0.000000679\end{aligned}$$

Appendix D

Calculation of impact of inflation on unemployment rate.

Year	I	U	I ²	I×U
2018	4.2	1.26	17.64	5.292
2017	3.63	1.25	13.1769	4.5375
2016	8.79	1.43	77.2641	12.5697
2015	7.87	1.43	61.9369	11.2541
2014	8.36	1.46	69.8896	12.2056
2013	9.04	1.55	81.7216	14.012
2012	9.46	1.58	89.4916	14.9468
2011	9.23	1.52	85.1929	14.0296
2010	9.33	1.52	87.0489	14.1816
2009	11.09	1.57	122.9881	17.4113
2008	9.91	1.34	98.2081	13.2794
2007	2.27	1.38	5.1529	3.1326
2006	6.92	1.55	47.8864	10.726
2005	6.84	1.71	46.7856	11.6964
2004	2.84	1.8	8.0656	5.112
2003	5.71	1.89	32.6041	10.7919
2002	3.03	1.88	9.1809	5.6964
2001	2.69	1.86	7.2361	5.0034
2000	2.48	1.82	6.1504	4.5136
1999	7.45	1.85	55.5025	13.7825
1998	11.24	1.71	126.3376	19.2204
1997	4.01	1.73	16.0801	6.9373
1996	9.22	1.7	85.0084	15.674
1995	7.63	1.7	58.2169	12.971
1994	8.35	1.74	69.7225	14.529
1993	7.51	1.65	56.4001	12.3915
1992	17.15	1.57	294.1225	26.9255
1991	15.56	1.58	242.1136	24.5848
1990	8.24	1.6	67.8976	13.184
Total	220.05	46.63	2039.023	350.5919

$$\begin{aligned}
a &= \frac{\Sigma i^2 \Sigma G - \Sigma I \Sigma IG}{n \Sigma I^2 - (\Sigma I)^2} \\
&= \frac{2039.023 \times 46.63 - 220.05 \times 350.5919}{29 \times 2039.023 - (220.05)^2} \\
&= \frac{95079.64249 - 77147.7476}{59131.667 - 48422.0025} \\
&= \frac{17931.89489}{10709.6645} \\
&= 1.67436
\end{aligned}$$

$$\begin{aligned}
b &= \frac{\Sigma I \Sigma U + n \Sigma IU}{n \Sigma S^2 - (\Sigma I)^2} \\
&= \frac{-220.05 \times 46.63 + 29 \times 350.5919}{29 \times 2039.023 - (220.05)^2} \\
&= \frac{-10260 + 10167.1651}{59131.667 - 48422.0025} \\
&= \frac{92.8349}{10709.6645} \\
&= -0.008668
\end{aligned}$$

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