

## Table of Contents

LETTER OF RECOMMENDATION

APPROVAL LETTER

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

### **CHAPTER I: INTRODUCTION**

1.1	Background of the Study .....	1
1.2	Statement of the Problem.....	2
1.3	Objectives of the Study .....	4
1.4	Hypothesis of the Study .....	4
1.5	Significance of the Study .....	4
1.6	Limitations of the Study.....	5
1.7	Organization of the Study .....	5

### **Chapter II: REVIEW OF LITERATURE**

2.1	Theoretical Review .....	6
2.1.1	Inflation.....	6
2.1.2	Determinants of Inflation: Economic Theories on Inflation.....	7
2.1.3	Demand-Pull Inflation .....	8
2.1.4	Cost-Push Inflation .....	9
2.1.5	Rational Expectations Theory of Inflation.....	10
2.1.6	Real Business Theory of Inflation .....	11
2.1.7	New Political Economy Theory of Inflation.....	12
2.1.8	Remittances.....	12
2.1.9	Remittances in Nepal .....	14
2.1.10	Impact of Remittances on Inflation.....	16
2.2	Empirical Review.....	19

## **CHAPTER III: RESEARCH METHODOLOGY**

3.1 Research Design.....	27
3.2 Nature and Sources of Data .....	27
3.3 Methods of Data Analysis.....	27
3.4 Tools of Data Analysis.....	28
3.4.1 Multiple Regression Analysis .....	28
3.4.2 Unit Root Test.....	28
3.4.2.1 Augmented Dickey Fuller (ADF) Test.....	29
3.4.4 Cointegration.....	30
3.4.4.1 Engle Granger Cointegration Test.....	31
3.4.5 Error Correction Model.....	32
3.5 Specification of Model.....	32
3.5.1 Model: Multiple Regression Analysis .....	32
3.6 Diagnostic Test .....	34
3.6.1 Serial Correlation Test (Breusch-Godfrey Test).....	34
3.6.2 Heteroscedasticity Test (Breusch-Pagan-Godfrey Test).....	34
3.6.3 Jerque-Bera Test .....	35
3.7 Variables Used in the Study.....	35

## **CHAPTER IV: DATA ANALYSIS**

4.1 Status of Remittance Inflows in Nepal .....	38
4.1.1 Recent Trend of Remittance Inflows in Nepal .....	38
4.1.2 Average Volume of Worker's Remittance Inflows in Nepal by Period .....	40
4.1.3 Size of Remittance Inflows in Nepal .....	41
4.1.4 Workers Remittance in Saving and Investment.....	42
4.2 Variables Used in the Model.....	45
4.3 Stationary Test of Variables.....	46
4.4 Cointegration Test: Engle-Granger Methodology .....	50
4.5 Evaluation of Estimates: Short-Run Relationship .....	52
4.6 Diagnostic Test of the Model.....	54
4.6.1 Serial Correlation Test .....	54
4.6.2 Breusch-Pagan-Godfrey Test.....	55
4.6.3 Jerque-Bera Test .....	55

4.7 Stability Test .....	56
--------------------------	----

**CHAPTER V: SUMMARY OF THE FINDINGS AND CONCLUSIONS**

5.1 Summary of the Findings .....	59
-----------------------------------	----

5.2 Conclusions .....	61
-----------------------	----

5.3 Recommendations .....	62
---------------------------	----

Bibliography

APPENDICES

# CHAPTER I

## INTRODUCTION

### 1.1 Background of the Study

Remittance has become a major component of an economy in recent history, especially in developing countries. According to Migration and Development Brief Report (World Bank Group, 2017), global remittances reached a record high at \$613 billion in 2017. Of the total, developing countries alone received \$422 billion. Remittances are now more than three times the size of official development assistance. Also, Remittance flows in middle and low income countries (LMICs) are significantly greater than Foreign Direct Investment (FDIs). Because, the official estimates of remittance includes transactions occurring through formal channels only, the true size of remittances is suspected to be significantly larger.

South Asia region receives a significant share of global remittances as employment opportunities are limited in such region. In 2017, the region received a total of \$112 billion as remittance. India became the top remittance receiving countries in 2017. Nepal was one of the top recipient countries in terms of Remittance-GDP ratio.

Large number of studies have been conducted exploring the impacts of remittances on economic, social and human development. However, very few studies have explored the relationship between remittances and the macroeconomic variable like Inflation. Remittances inflows can create pressure on domestic inflation, by altering the money supply. The extent of domestic inflationary pressure depends on the sterilization policy of central bank (Maskay, Steinkamp, & Westermann, 2015).

Remittance is an important demand side variable of inflation and is expected to affect inflation from the perspectives of exchange rates, money supply and balance of payments. Workers' remittance inflows have a spending effect in the recipient economies. At the micro level remittances directly lead to an increase in household income which in turn raises their demand for goods and services. This excess demand brings inflationary pressure to the economy and triggers nontradables' price level (Roy & Rahman, 2014).

The interrelationship between remittance inflows and inflation can be highly pronounced in small country like Nepal which received about 26.3% of remittances relative to GDP, equivalent to Rs 695.5 billion in Fiscal Year 2015/16(Government of Nepal, 2017). According to National Living Standard Survey 2010/11, almost 79 percent of remittance incomes in Nepal are spent on consumption expenditure, which poses a likelihood of demand-pull inflation.

This study therefore tries to explore the extent to which inflows of remittances affects the domestic inflation in Nepal.

## **1.2 Statement of the Problem**

Although plethora of studies have explored the impact of remittances on social and economic development, very few have explored its interrelationship with inflation. The inflationary effect of remittances occurs through a change in both aggregate demand and aggregate supply. Large remittance inflows can increase money supply in the economy, thereby putting pressure on domestic inflation, unless central bank engages in a sterilization policy to offset monetary expansion. In country with flexible exchange rate regime, remittance inflows can real exchange rate to appreciate. This is because higher disposable income with people causes higher demand of domestic or non-

tradable goods, thereby increasing its price. However, price of tradable goods are fixed in international context and remains same. This causes the appreciation of real exchange rate and therefore the domestic good or industries might lose its competitiveness. Under fixed exchange regime, prices go up as resources move from tradable to non-tradable (Upadhyay & Upadhyay, 2011).

Impact of remittances on Inflation can be more visible in a small country like Nepal where remittances share in GDP is as high as 26%. It is because the small size of economy entails less absorbing capacity of such high capital inflows. Moreover, it has become the single biggest source of foreign exchange earnings in Nepal. Currently, Nepal is the first remittance-receiving country in the world in terms of the percentage of the Gross Domestic Product (GDP); this swelled from 1.5 percent of GDP in 1993 to 32.2 percent in 2015—6.7 billion US\$ (World Bank 2016). It has profound implications for the country's economy. For instance, the Nepal Living Standard Surveys (NLSSs) show that remittance income has significantly contributed reducing the head count poverty rate from 42 percent in 1995/1996 to 31 percent in 2003/2004 and then 25 percent in 2010/2011, as the percent of sampled households receiving remittances has sharply increased from 23.4 percent in 1995/1996 to 55.8 percent in 2010/2011 (Central Bureau of Statistics, 2011). Moreover, remittance flow in Nepal has offset large trade deficits and enabled maintaining a current account surplus (World Bank Group, 2010).

Thus the study makes an attempt to explore the interrelationship between Inflation and Remittance. The research question is: Does remittances inflow cause inflation in Nepal?

### **1.3 Objectives of the Study**

The general objective of the study is to ascertain the relationship between remittance inflows and inflation in Nepal. The specific objectives are:

- To study the trend of remittance inflows in Nepal
- To examine the impact of remittance inflows on Inflation in Nepal

### **1.4 Hypothesis of the Study**

The null and alternative hypothesis of the study are:

Null Hypothesis (H<sub>0</sub>): Worker's Remittance inflow does not cause inflation in Nepal

Alternative Hypothesis (H<sub>1</sub>): Worker's Remittance inflow causes inflation in Nepal

### **1.5 Significance of the Study**

Nepal receives large volume of remittance every year. The remittances share in GDP of Nepal is about 25% which makes it almost equivalent to agricultural sector which is the largest sector of Nepalese economy. Although, abundance of research literature can be found exploring the economic and social impact of remittances inflows, very few research has explored the relationship between remittances inflows and inflation in Nepal. However there are several reasons to suspect that there exists relationship between inflation and remittance inflows. Remittances inflows can increase money supply in the economy and thereby put inflationary pressure in economy, unless central bank come up with sterilization policy to absorb excess money supply in the economy. Also, since remittances increase disposable incomes in the hand of consumers, it can induce demand pull inflation.

This study therefore explores to what extent remittances inflows can explain the inflation rate in Nepal. The finding of the study can be a valuable input for the central

bank of Nepal to formulate and implement efficient monetary policy, one of the chief goal of which is to contain inflation rate of economy at the desired level. Also, the findings from the study can be vital for the monetary authority of Nepal to assess the effectiveness of the sterilization policies which are aimed at absorbing the excess money supply in the economy due to inflows of large volume of remittances.

### **1.6 Limitations of the Study**

Followings are the limitations of the study:

- Because of limited resources at the disposable of researcher, the study covers limited scope
- Limited time available is another constraints of the study
- The study covers only the time period over 1975-2017
- The study exclusively makes use of secondary data. The reliability of data is not checked for.

### **1.7 Organization of the Study**

The first chapter of the study is the introduction including general background, statement of the problem, objectives of the study, hypothesis of the study, significance of the study and limitation of the of the study. The second chapter of the study is the review of the literature including both theoretical concepts, international context and national context. Third chapter is the research methodology with the framework of research, research design and various econometric models and tests. Fourth chapter will be the data presentation and analysis of the study. Finally, the fifth chapter is the Summary, conclusion and recommendation.



## **CHAPTER II**

### **REVIEW OF LITERATURE**

#### **2.1 Theoretical Review**

##### **2.1.1 Inflation**

Inflation is the rate of increase in prices over a given period of time. Inflation is typically a broad measure, such as the overall increase in prices or the increase in the cost of living in a country. But it can also be more narrowly calculated—for certain goods, such as food, or for services, such as a haircut, for example. 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, 2010).

Consumers' cost of living depends on the prices of many goods and services and the share of each in the household budget. To measure the average consumer's cost of living, government agencies conduct household surveys to identify a basket of commonly purchased items and track over time the cost of purchasing this basket. (Housing expenses, including rent and mortgages, constitute the largest component of the consumer basket in the United States.) The cost of this basket at a given time expressed relative to a base year is the consumer price index (CPI), and the percentage change in the CPI over a certain period is consumer price inflation, the most widely used measure of inflation (Poudyal, 2014)

It is the mostly discussed issue all over the world among policy makers and academia. It is because of the fact that its effects are widespread and severe and the impacts are far reaching. Inflation has been the major concern for the government since it has serious implication for the living of common peoples. Moreover, it affects several macroeconomic variables such as saving, investment, real interest, real wage, real

income and level of employment. Inflation depreciates domestic currency and the imports become more expensive which further push up the domestic prices. In short, inflation is a burning issue in the macroeconomics and main objective and function of central bank is to control inflation.

### **2.1.2 Determinants of Inflation: Economic Theories on Inflation**

Different economic theories present different explanation on the cause of inflation. One pioneering theory of inflation was Quantity Theory of Money (QTM). The quantity theory of money states that there is a direct relationship between the quantity of money in an economy and the level of prices of goods and services sold. According to QTM, if the amount of money in an economy doubles, price levels also double, causing inflation (the percentage rate at which the level of prices is rising in an economy). The Quantity Theory of Money (QTM) can be expressed in the equation form as below:

$$MV = PT$$

Where,

**M** = Money Supply

**V** = Velocity of Circulation (the number of times money changes hands)

**P** = Average Price Level

**T** = Volume of Transactions of Goods and Services

During Keynesian era inflation was believed to be caused by either an increase in aggregate demand or a decrease in aggregate supply. Inflation that was spurred by increase in aggregate demand was called ‘demand-pull inflation’ while supply shocks were supposed to cause ‘cost-push inflation’. During the Keynesian era, fiscal policy was considered an important tool in controlling inflation.

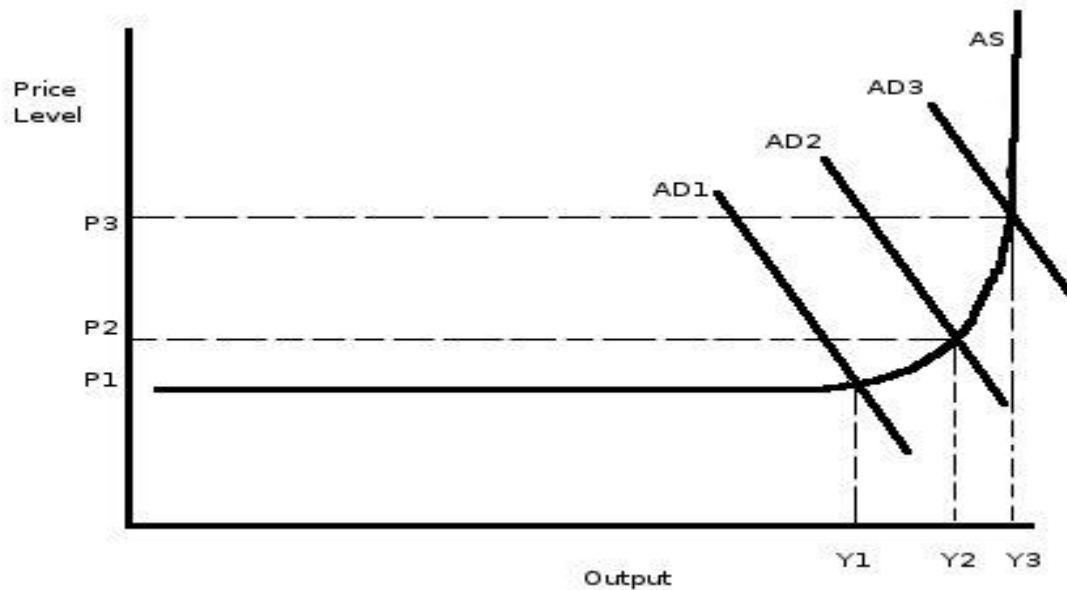
### **2.1.3 Demand-Pull Inflation**

Demand-pull inflation is used by Keynesian economics to describe what happens when price levels rise because of an imbalance in the aggregate supply and demand. When the aggregate demand in an economy strongly outweighs the aggregate supply, prices go up. Economists describe demand-pull inflation as a result of too many dollars chasing too few goods (Investopedia, 2019).

There are five causes for demand-pull inflation:

1. A growing economy: When consumers feel confident, they will spend more, take on more debt by borrowing more. This leads to a steady increase in demand, which means higher prices.
2. Asset inflation: a sudden rise in exports, which translates to an undervaluation of the involved currencies
3. Government spending: When the government opens up its pocketbooks, it drives up prices. Military spending prices may go up when the government starts to buy more military equipment.
4. Inflation expectations: forecasts and expectations of inflation, where companies increase their prices to go with the flow of the expected rise
5. More money in the system: demand-pull inflation is produced by an excess in monetary growth or an expansion of the money supply. Too much money in an economic system with too few goods makes prices increase.

**Figure 2.1: Demand-Pull Inflation**



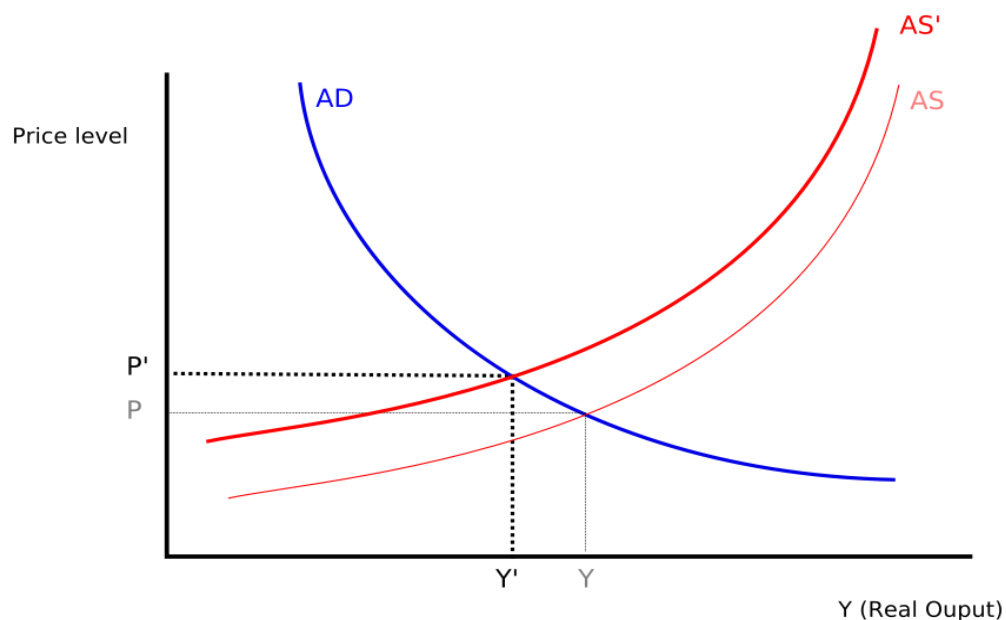
#### **2.1.4 Cost-Push Inflation**

Cost push inflation is inflation caused by an increase in prices of inputs like labour, raw material, etc. The increased price of the factors of production leads to a decreased supply of these goods. While the demand remains constant, the prices of commodities increase causing a rise in the overall price level. This is in essence cost push inflation. In this case, the overall price level increases due to higher costs of production which reflects in terms of increased prices of goods and commodities which majorly use these inputs. This is inflation triggered from supply side i.e. because of less supply. The opposite effect of this is called demand pull inflation where higher demand triggers inflation.

Apart from rise in prices of inputs, there could be other factors leading to supply side inflation such as natural disasters or depletion of natural resources, monopoly, government regulation or taxation, change in exchange rates, etc. Generally, cost push

inflation may occur in case of an inelastic demand curve where the demand cannot be easily adjusted according to rising prices (The Economic Times, 2019).

**Figure 2.2: Cost-Push Inflation**



### 2.1.5 Rational Expectations Theory of Inflation

This theory has been formulated by John Muth and is supported by new classical economists such as Robert E. Lucas, Thomas J. Sargent, Neil Wallac etc. This theory states that individuals and companies, acting with complete access to the relevant information, forecast inflation in the future without bias. Errors on their forecasts are assumed to result from random components. Unlike in adaptive expectation principle, people do not consistently make the same prospect. Economic agents form their macroeconomic expectations “rationally” based on all past and current relevant information available, and not only on past information. The expectations are, however,

totally random, or independent of each other. The Rational Expectation approach to the business cycle and prices generated a vertical PC both for the short- and the long run. If the monetary authority announces a monetary stimulus in advance, people expect that prices rise. Fully anticipated monetary policy cannot have any real effects even in the short-run. Thus, the central bank can affect the real output and employment only if it can find a way to create a price surprise. Otherwise, forward-looking expectation adjustments of economic agents will fail the pre-announced policy. Likewise, if a disinflation policy is announced in advance, it cannot reduce prices if people do not believe that the government will really carry it out. That is price expectations are closely related to the policy credibility and reputation for successful implementation (Nepal Rastra Bank, 2007).

#### **2.1.6 Real Business Theory of Inflation**

The real business cycle (RBC) theorists (such as Edward C. Prescott, Finn E. Kydland and Charles I. Plosser) argued that upswings and downswings in economic activity originate from real (or aggregate supply) shocks rather than monetary (or aggregate demand) shocks. It assumes fixed aggregate demand curve, continuous market clearing, imperfect information, and rationality of expectations. The effects of supply shocks (e.g., process and production innovations, discovery of new sources of raw materials, changes in relative prices of foods and energy, bad weather, and nominal effective exchange rate changes) cause inflation, which is based on the business cycle. It does not, however, explicitly explain inflation; rather, it particularly focuses on real output effects of adverse, or negative, supply shocks such as deviations of factor productivity from trend or relative price changes caused by oil price shocks. However, the main contribution of RBC economists is that they call our attention to the possibility of the important role of supply shocks in explaining inflation. Neoclassical, monetarist and

new classical economists ignored the possibility of adjustment lags (Nepal Rastra Bank, 2007).

### **2.1.7 New Political Economy Theory of Inflation**

New political economy theory of inflation The theories as mentioned above mainly focus on macroeconomic determinants of inflation (e.g., monetary and real shocks, and inertia in inflation) and simply ignore the role of non-economic factors such as institutions, political process and culture in process of inflation. They also overlook the possibility that sustained government deficits may be partially or fully endogenized by considering the effects of the political process and possible lobbying activities on government budgets, and thus, on inflation. Political forces, not the social planner, choose economic policy in the real world. Economic policy is the result of a decision process that balances conflicting interests so that a collective choice may emerge (Drazen, 2000). It, therefore, provides fresh perspectives on the relations between timing of elections, policymaker performance, political instability, policy credibility and reputation, central bank independence and the inflation process itself.

### **2.1.8 Remittances**

Generally, remittances refer to that portion of migrants' earnings sent from the migration destination to the place of origin. Even though they can also be sent in kind, the term 'remittances' is normally limited to denote monetary and other cash transfers transmitted by migrant workers to their families and communities. Remittance has become a major component of economies in recent history, especially in developing countries. According to Migration and Development Brief Report (WorldBank, 2017). Global remittances reached a record high at \$613 billion in 2017. Of the total, developing countries alone received \$422 billion. Remittances are now more than three times the size of official development assistance. Also, Remittance flows in middle and

low income countries (LMICs) are significantly greater than Foreign Direct Investment (FDIs). Because, the official estimates of remittance include transactions occurring through formal channels only, the true size of remittances is suspected to be significantly larger.

The increased global integration and the enhancement in communication technology have facilitated the movement of labour from one country to another and, as a result, the flow of remittances started growing at a higher pace. While there is a moderate rise in remittances transmitted to developed countries, the remittances sent by migrants to developing countries has witnessed dramatic surge recently. This happened precisely after 1990s when the migration from developed countries in the North accepted many migrant workers from the poor South.

According to International Monetary Fund, remittances denote “household income from foreign economies arising mainly from the temporary or permanent movement of people to those economies. Remittances include cash and noncash items that flow through formal channels, such as via electronic wire, or through informal channels, such as money or goods carried across borders. They largely consist of funds and noncash items sent or given by individuals who have migrated to a new economy and become residents there, and the net compensation of border, seasonal, or other short-term workers who are employed in an economy in which they are not resident” (International Monetary Fund, 2009).

Many governments now consider remittances to be of high policy interest and wish to analyze their impact on economic development and security. Also, international institutions, including the World Bank, the Bank for International Settlements, and regional development banks, have programs devoted to analysing remittances. These



institutions and others consider remittances to be an important anti-poverty tool and are striving to lower the costs and other barriers to sending remittances, and to facilitate the transfer of remittances via formal channels through improved regulatory and institutional arrangements.

### **2.1.9 Remittances in Nepal**

Remittances have become a major source for hard currencies for the national economy and so have become for a household. Number of remittance receiving household has reached 56 percent in the country. Remittance has approximately 25 percent share in GDP and has surpassed the incomes received from tourism and national exports. On the heels of a massive increase in labour migration abroad, remittances flowing into Nepal as a share of GDP doubled from 14.9 per cent in 2005/06 to 32.1 per cent in 2015/16 (International Labour Organization, 2014).

One the Nepal's major exports is labor, and most rural households now rely on at least one member's earnings from employment away from home. Nepalese workers have sought foreign employment as both the agricultural and non-agricultural sectors struggle to generate new employment opportunities. With limited arable land, landlessness is pervasive and the number of landless households has steadily increased in the agricultural sector. In the non-agricultural sector, the slowdown in growth, especially since 2000/01, due to the Maoist insurgency and exogenous shocks has further retarded the pace of employment creation. The conflict had also, until recently, created difficult living and security conditions, especially in the rural areas. It had also prompted people to look for overseas employment.

India has been a traditional destination for Nepalese migrants. The primary reasons for this are geographical proximity, historical and cultural links, and a large and open

porous border. The 1950 Treaty of Peace and Friendship between India and Nepal formalized free border movement of people. The bulk of these migrants are employed in the private, informal sector. These migrants hold semi-skilled and unskilled jobs in restaurants and factories or are employed as domestic workers, security guards, and maids. However, a significant proportion of the remittances from India are not recorded in the BoP as they are brought in by the migrants themselves or sent through relatives and friends. An increasingly larger share of remittances now comes from countries other than India, reflecting changing migration patterns and higher earnings in these locations. Moreover, the composition of skills of the labor flows is different among destinations. While migrants to the Middle East are employed mostly as security personnel, chauffeurs, and construction workers, the demand from South East Asian countries is more for employment in industrial enterprises. Because of the potential positive effect of remittances generally, Nepal has been giving due priority in promoting overseas employment and mobilizing remittances so as to maximize the benefits from these transfers (Pant, 2011).

According to Economic Survey 2017/18, Nepal received about Rs 471.9 billion in first eight months of the fiscal year 2017/18. In previous fiscal year Nepal received Rs 695.5 billion as remittances. In fiscal year 2016/17, Nepal received a total of Rs 695.5 billion in remittance inflows, which was 26.3% of the size of the country's GDP. In the same year, the share of remittance inflows to current transfer income was 60.6%. Remittance inflows in Nepal is the major source of foreign exchange reserve in Nepal. Despite of large discrepancy between export and import, remittance inflows has helped to improve Balance of Payment (BoP) of Nepal. Balance of Payments in the first eight months of the fiscal year 2017/18 ran into deficit of 25 billion after the fiscal year 2009/10 for the first time. One of the underlying cause was the decrease in the rate of remittance inflows

in Nepal following the global economic slowdown. This reflects the heightened role of remittance inflows in maintaining the healthy level of BoP in Nepal.

**Table 2.1: Remittance in Nepal**

<b>Indicators</b>	<b>2013/14</b>	<b>2014/15</b>	<b>2015/16</b>	<b>2016/17</b>	<b>2017/18(first 8 month)</b>
Remittance Inflows( Rs Billion)	543.3	617.3	665.1	695.5	471.9
Growth rate of Remittance (percentage)	25	13.6	7.7	4.6	4.9
Remittance to total GDP ratio	27.7	29	29.6	26.3	-
Share of remittance on current transfer income	85.6	86.6	85	81.3	86.9

**Source: Economic Survey 2017/18**

### **2.1.10 Impact of Remittances on Inflation**

Remittance is an important source of foreign income for developing countries like Nepal increasing at unprecedented rate in size and volume over recent decades. It is a private income that is regularly or periodically transferred from international migrants to family members in their country of origin. It represents one of the largest sources of financial flows to developing countries. Foreign employment is gradually getting a major source of foreign exchange earnings and sustaining the positive balance of payment in Nepal (Dhungana, 2012). Yearly remittance inflows in Nepal have averaged about 25% of GDP and Nepal is one of the top countries to receive large share of remittance relative to its GDP.

Remittances can have inflationary impact on the economy if the demand generated by remittances is greater than the economic capacity to meet the demand. This mechanism where price increases due to the rise in aggregate demand due to remittance inflows is known as demand-pull inflation. This explanation of increase in price level when aggregate demand exceeds aggregate supply of the economy is used in Keynesian economics.

The effect of remittances on inflation can be viewed from three different perspectives; namely, from the point of view of appreciating exchange rates, increasing money supply, and balance of payments. The rising level of remittances in developing economies can have a spending effect. This can trigger a rise in the price level of non-tradables. The Salter (1959), Swan (1960), Corden (1960) and Dornbusch (1974) paradigm offers an avenue for understanding the theoretical relationship between capital inflows (in our case, remittances), the price level, and the real exchange rate in developing economies. The model shows that an increase in remittances could cause a real exchange rate appreciation via rising domestic prices. More importantly, the extent of the effect of a rising level of remittances on domestic prices will depend on the country's exchange rate regime (Narayan & Narayan, 2006). In Salter -Swan -Corden -Dornbusch paradigm a rise in capital flows increases real wages, which in turn bring out a rise in domestic demand and hence in prices of nontradable goods relative to tradable goods that are exogenously priced. Since the REER is generally defined as the value of domestic prices of nontradable goods relative to prices of tradable goods, a rise in the relative price of nontradable goods corresponds to a real exchange appreciation (spending effect). This is indicative of the presence of —Dutch Disease effects which describes the side effect of natural-resource booms or increases in capital flows on the competitiveness of export-oriented sectors and import competing sectors.

According to Reinhart and Rogoff (2004), the impact of capital inflows on macroeconomic variables is conditional on exchange rate regime. For a country with flexible exchange rate regime, the large inflows of remittance will raise price level and appreciate real exchange rate. However, for a country with fixed exchange rate regime, large remittance inflows will cause contraction of tradable goods and increase in price level.

Another dimension on how remittance inflows can cause inflation is related to money supply. When large inflows of foreign exchange are remitted by expatriates to their home country, the conversion of this foreign exchange into domestic currency raises the money supply. If this is not absorbed into productive sectors (or capital investment), then it goes into consumption expenditure, fuelling inflation. Remittances also boost real wealth, which stimulates consumption expenditure. This creates short-run excess demand, which drives up the price level (Narayan, Narayan, & Mishra, 2011).

The relationship between remittances and inflation can also be looked at from the point of view of the balance-of payments and foreign reserves accumulation, as follows. Remittances can also be a source of balance-of-payments surplus and international reserves accumulation. Failure of central banks to fully sterilise the increase in international reserves will lead to an increase in the monetary base. This will result in further appreciation of the exchange rate. As a result, there will be an upward pressure on prices.

The inflow of remittance raises the income of the remitter household, which causes the fall in labour supply. The limited labour supply shrinks the labour markets, which uplifts wages and increases the cost of production that eventually leads towards contraction of the sector. Consequently, the exchange rate and the ratio of the outputs

encourage high spending and resource movements that generate an inflationary situation (Acosta, Lartey, & Mandelman, 2009). Since remittance inflows are simple income transfers, recipient households may rationally substitute unearned remittance income for labor income. Regardless of their intended use, remittance transfers may be subject to moral hazard problems (Jahjah, Chami, & Fullenkamp, 2003). These problems may induce recipients to divert resources to the consumption of leisure, thereby reducing their labor market effort.

## **2.2 Empirical Review**

Many studies have addressed relationship between capital inflows and the macroeconomic impacts it might have in an economy. One such macroeconomic impacts capital inflows might have in an economy is inflation. Muinhos (2000) using a 5×5 Vector Auto Regression(VAR) with the US interest rate, capital inflow, the real exchange rate, the real wage and inflation or even a 4×4 VAR (not including US interest rate) found a negative relationship between capital inflow and inflation. The study concludes that in a context of capital inflows, there is an appreciation of the real exchange rate that causes a decrease in wages and inflation. Another possibility is that capital inflows decrease the government debt and that reduction affects negatively inflation. Agcaoili (2011) also supported the claim exclaiming that domestic economy of the emerging markets is capable of absorbing the strong inflow without resulting inflation.

In contrast, Kim & Yang (2008) studied emerging East Asian Economies and concluded that capital inflows cause asset prices to appreciate. The study covered five countries, namely, Indonesia, Korea, Malaysia, Philippines, and Thailand. The estimation period is from the first quarter of 1999 to the first quarter of 2006. Quarterly data is used. Using

Impulse Response Function which measures the response of one variable to exogenous shock on other variable, within VAR framework was used in the study.

Abdul-Mumuni & Quaidoo (2016) using bounds testing approach, empirically found that international remittances have a significant effect on inflation in the long-run in Ghana. However, in the short-run, no significant relationship is evident between these two variables. The study examines data between 1979 to 2013 by incorporating international remittances as an exogenous variable to the standard inflation function. The study recommends that in order to reduce the effect of international remittances on inflation rate and increase the impact on growth, the government should improve public infrastructure. By this, excessive transfer fees would reduce and these remittances could be channelled into more productive sectors rather than being used mainly for consumption purposes.

Khan & Islam (2013) found that one percent increase in remittances inflows increases inflation rate by 2.48 percent in the long run, whereas no significant relationship is evident between these two variables in the short-run in Bangladesh. The study used macroeconomics data of Bangladesh between 1972-2010. The empirical model of the study is as below:

$$\dot{P} = f(G, NEER, M_2, RM)$$

Where, G is Government Expenditure, NEER is Nominal Effective Exchange Rate,  $M_2$  is money supply and RM is remittance inflows. The study reports cointegrating relationship between inflation and other variables. The study proceeds with Error Correction Model (ECM) to study both long run and short run relationship of variables with inflation. The study also uses Granger-Casualty Analysis to examine the

relationship between Inflation and Remittances using data between 1972-2010 of Bangladesh. The test indicates that there is unidirectional casualty from remittances flows to the inflation rate in Bangladesh.

Nisar & Tufail (2013) also found significant positive relationship between remittance inflows and inflation in Pakistan. The study employed Johansen and Johansen & Juselius cointegration technique to check the existence of long run relationship between remittances and inflation. Vector Error Correction technique is further applied to examine the extent and direction of relationship between variables and to check the stability of models. The results indicated the existence of one cointegrated vector for all equations. Moreover, remittances, money supply and real per capita income are found to have positive impact on inflation and its different categories. The results revealed that among different inflation categories food inflation is most effected and housing & construction inflation is least effected by remittances. Budget deficit is significant in reducing foot wear and textile inflation only. On the other hand trade openness is effective in reducing all types of inflation by same magnitude and strength. Given the inflationary nature of remittances it becomes necessary for government to channelize the remitted funds into productive investment to avoid surge in demand pull inflation.

Ngoc & Nguyen (2014) examined the impact of remittances on inflation in Vietnam during 1996-2012. Using the vector autoregressive model (VAR), they show that remittance causes inflation indirectly through increasing money supply. The study found the transmission mechanism of remittance to inflation in the context of a fixed exchange rate regime. They conclude that failure of central bank of Vietnam to sterilize the excess money supply because of inflows of remittances might explain the inflation.



Narayan, Narayan, & Mishra (2011) study on 54 developing countries, found that remittance is significant determinant of inflation. The empirical analysis is based on annual data covering the period 1995-2004 for 54 developing countries. These include: Albania, Argentina, Armenia, Azerbaijan, Bangladesh, Bolivia, Botswana, Brazil, Cameron, China, Colombia, Congo Republic, Costa Rica, the Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Gabon, Ghana, Guatemala, Guinea, Guyana, Haiti, Honduras, India, Indonesia, Jamaica, Jordan, Latvia, Lithuania, Malawi, Mali, Mexico, Moldova, Morocco, Namibia, Nicaragua, Niger, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Senegal, Sierra Leone, Slovenia, Sri Lanka, Sudan, Togo, Trinidad and Tobago, Tunisia, and Yemen. The sample of countries includes 19 African countries, 17 Central and South American countries, eight European countries and seven Asian countries. The study finds that the effect of remittances on inflation is more pronounced in the long-run. Moreover, we find that openness, debt, current account deficits, the agricultural sector, and the short-term U.S. interest rate have a positive effect on inflation. We also find that improvements in democracy reduce inflation.

Glystos & Katseli(1986) studied remittance-inflation nexus and found that remittances affects the inflation in the home country negatively. Lopez, Lopez, & Cruz-Zuniga (2008) found different results for different exchange rate regime. Under fixed exchange regime, increase in remittances positively affects inflation. Under flexible exchange regime, increase in remittances decreases inflation. This paper uses a theoretical model and panel vector autoregression techniques to understand the effect of remittances on GDP, inflation, real exchange rate and money supply, depending on the exchange rate regimes. Furthermore, it allows a more detailed description of the short-run dynamics as it considers yearly but also quarterly data for 21 emerging countries. The theoretical model of the study predicts that remittances should temporarily increase inflation, GDP,

the domestic money supply and appreciate the real exchange rate under a fixed regime, but temporarily decrease inflation, increase GDP, appreciate the real exchange rate and generate no change in the money supply under a flexible regime. Therefore the true effect of remittances on economies by showing that exchange rate regimes matter for the effects of remittances, especially in the short run for monetary conditions in an economy, and suggests that other results in the literature that do not control for regimes may be biased.

Nisar & Tufail (2013) using regression analysis found that remittances are positively associated with inflation and other categories of inflation each representing a particular commodity group. Apart from remittances money supply and real per capita income also effect inflation positively, while trade openness has a negative effect on inflation and its different categories. The effect of all explanatory variables is highest on food inflation and is lowest on housing & construction inflation except trade openness that affects each commodity group with the same magnitude. The study employs annual data for consumer price index, food price index, footwear and textile index, housing and construction index, remittances, money supply, real per capita income, budget deficit and trade openness. All the dependent and explanatory variables are taken in natural logarithm form except budget deficit and trade openness which are expressed as percentage of GDP. Logarithm of Consumer price index is used as a proxy of overall inflation rate. Remittances, money supply and per capita income are taken in real form; this is done by dividing the variable with the GDP deflator with base 2000-2001. The study covers the time period from 1970- 2010. The long run relationship between remittances and inflation for the time period 1970- 2010 is assessed through Johansen (1998) and Johansen and Juselius (1990) cointegration technique. Cointegration is used

to determine long run relationship between two or more variables that are individually non stationary but their linear combination turns out to be stationary.

Adhikari & Guru-Gharana (2014) using money demand and money supply function concluded that the Indian workers' remittances from foreign countries do increase the domestic price level but the increase is insignificant. One of the reasons for this finding could be the relative contribution of Indian workers' remittances in India's GDP. The study considers the case of India over the years 1978-2009. The data on all the variables in this study, such as, the price level (p), the foreign remittance (FR), the GDP at current prices, the real interest rate (i), and the GDP deflator was collected from the World Bank publication, "World Development Indicators, 2011." The OLS estimates of equation of the study are presented below:

$$\text{INFL\_RATE} = 7.746940 + 0.015600 \text{ REM\_RATE} - 0.202906 \text{ GDP\_RATE} + 0.018053 \text{ INT\_CHANGE}$$

This finding implies that the foreign remittance by Indian workers working abroad does increase the domestic inflation rate, but the increase is not significant. The reason for this finding could be a small contribution of Indian workers' remittances in India's GDP. The data from 2009 show that the workers' remittances are only 3.6 percent of the country's GDP. That means the remittance amount is not big enough in relation to the national income to increase the foreign component of the money supply and thereby cause a sizable increase in the nation's money supply and eventually a significant rise in the domestic price level.

Several studies have been conducted in Nepal as attempts to ascertain the determinants of inflation in Nepal. Although these studies have not included remittance inflows as an independent variables to measure inflation in Nepal, we review them for the purpose

of our study. One study done by Pandey (2005) identified money supply (both narrow and broad), real GDP, government expenditure, Indian inflation and exchange rate as explanatory variables influencing inflation, over the period 1973 to 2004 in Nepal.

Price Division and Economic Analysis Division (2006) of Nepal Rastra Bank in a study using open economy monetary model, has found Indian inflation to have a significant and near unitary effect on inflation in Nepal. This interpretation resulted from empirical regression utilizing Ordinary Least Square (OLS) on annual time series data over 1975 to 2006. The explanatory variables are growth rates of real GDP, money supply (both narrowly and broadly defined), interest rate on fixed deposit and Indian inflation.

Khatriwada (1994) had examined the inflation process in Nepal utilizing basis the quantity theory of money. Initially, results showed low explanatory power and suggested that there were other missing variables in the equation. When open economy variables, such as Indian inflation and the exchange rate, were included this showed significant increase in the explanatory power of the equation. The study had also included structural variables such as per-capita output and government expenditures, but those did not have a significant effect being "swamped" by the monetary variables.

Mathema (1998) has used an expectation augmented Phillips Curve approach to examine whether the nominal wage increases are the most significant sources of cost push inflation. The final equation used by the study is:

$$P = a + a \text{GDPR} + a \text{M} + a \text{W} + a \text{PI} + a \text{PE} + \epsilon$$

Here, Annual CPI inflation (P), real GDP growth (GDPR), change in money supply (narrowly defined; M), change in wages (W), change in imported price (PI) and change in price expectation (PE) are the variables where excess demand proxies for unemployment. The data for the study period is 1978/79 and 1995/96. OLS and unit

root tests are performed for stationarity test of the variables chosen. The author finds the importance of several wage variables for influencing domestic inflation but surprisingly does not find significant effect of imported prices. The author attributes this to "absorption of the effect of WPII (whole sale prices of India) by the money wages of laborers in the homeland. Granger Bivariate Causality Test finds unilateral causation from the rate of inflation to wages of agricultural and masonry labour while industrial wages causes inflation in Nepal.

Institute for Sustainable Development (1994), in a study conducted for Nepal Rastra Bank, used an approach of the monetarist and structuralist views. The study had identified money supply, international prices (particularly Indian prices), exchange rate, real output, government expenditure and expectation factors as major sources of inflation in Nepal. Similarly, infrastructural bottlenecks, imperfect market condition and market oriented economic policies are also instrumental for inflation escalation. The study utilized simple regression analysis and find that the explanatory power of a closed economy monetarist model (where price is the function of money supply and real output) is very low; the study therefore included external variables of an open economy model of regression analysis which includes Indian wholesale price exchange rate, lagged effect of money supply, government expenditure as additional explanatory variable.

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

Research design is a detailed outline of how an investigation will take place. A research design will typically include how data are to be collected, what instruments will be employed, how the instruments will be used and the intended means for analysing data collected. This research was conducted under quantitative design.

#### **3.2 Nature and Sources of Data**

The study makes use of secondary data only. Reports, publications and journals of Nepal Rastra Bank (NRB), Ministry of Finance (Mof) and International Monetary Fund (IMF) are used to gather relevant data needed for the study. Data on Remittance and Broad Money Supply and Consumer Price index of Nepal were collected from Nepal Rastra Bank (NRB). Data on Consumer Price Index of India was taken from International Financial Statistics, World Bank. Data on GDP were collected from Economic Survey of Ministry of Finance. Data on relevant variables for time period 1975-2017 has been used for the study.

#### **3.3 Methods of Data Analysis**

Secondary data used in the study are analysed using computer software Eviews. Different tables and figures are prepared for different economic variables. Statistical and mathematical operation, calculation and different tools like regression, unit root test and co-integration test will be carried out for secondary information of data. Both qualitative and quantitative way is used for description of secondary data.

### **3.4 Tools of Data Analysis**

#### **3.4.1 Multiple Regression Analysis**

Multiple Regression Analysis refers to a set of techniques for studying the linear relationships among two or more variables. A simple multiple regression analysis will be in the form as below:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + \dots + u$$

In the model, Y is dependent variable whereas X<sub>1</sub>, X<sub>2</sub> and X<sub>3</sub> are independent variables. U is the error term and a is an intercept term. b<sub>1</sub>, b<sub>2</sub> and b<sub>3</sub> are coefficients which gives their relationships of respective independent variables with dependent variables. The sign and magnitude of the coefficients gives us the relationship between dependent and independent variables. The positive sign of coefficient implies the positive relationship between dependent and independent variables and vice versa. Although the regression problem may be solved by a number of techniques, the most-used method is least squares. In least squares regression analysis, the b's are selected so as to minimize the sum of the squared residuals. This set of b's is not necessarily the set you want, since they may be distorted by outliers--points that are not representative of the data. When we put all variables of multiple regression in natural log form, we can interpret the coefficients terms as elasticity coefficient.

#### **3.4.2 Unit Root Test**

A time series is a collection of observations made sequentially through time. A time series is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two-time periods depends only on the distance or gap or lag between the two-time periods and not the actual time at which the covariance is computed. The stationary or otherwise of a series can strongly influence its behaviour

and properties- e.g. persistence of shocks will be infinite for nonstationary series. If the time series data is not stationary there is the problem of spurious regression i.e.; if two variables are trending over time, a regression of one on the other could have a high  $R^2$  even if the two are unrelated. Secondly, If the variables in the regression model are not stationary then it can be proved that the standard assumptions for asymptotic analysis will not be valid. In other words, the usual t- ratios will not follow a t- distribution, so we cannot validly undertake the hypothesis tests about the regression parameters. Thus, before performing any kind of the test or the model it is necessary to find out whether the data are stationary or not and that can be done by using the unit root test.

Times Series variables first must pass through stationary test before we run regression analysis on them. Any sequence that contains one or more characteristic roots that are equal to one is called a unit root process. A unit root test tests whether a time series variable is stationary and possesses a unit root. In order to avoid spurious results in dealing with time series, it is necessary to test formally for the presence of a unit root for each variable.

Augmented Dickey Fuller Test (ADF) is one of the simple test to detect unit root in non-stationary time series variables.

#### **3.4.2.1 Augmented Dickey Fuller (ADF) Test**

Augmented Dickey–Fuller test (ADF) tests the null hypothesis that a unit root is present in a time series sample. The alternative hypothesis is different depending on which version of the test is used, but is usually stationarity or trend-stationarity. It is an augmented version of the Dickey–Fuller test for a larger and more complicated set of time series models.



The testing procedure for the ADF test is the same as for the Dickey–Fuller test but it is applied to the model

$$\Delta x_t = \mu + \gamma t + \alpha x_{t-1} + \sum_{j=1}^{k-1} \beta_j \Delta x_{t-j} + u_t$$

Where  $x_t$  is the time series to be tested for unit root,  $\Delta$  is the difference operator is the time trend, and  $u_t$  is a white-noise error term. The test is based on the t ratio of  $\alpha$  coefficient. Note that  $k \geq 1$  and for  $k = 1$ , the test does not include any augmentation and is simply called the Dickey-Fuller test.

In above equation Standard Dickey-Fuller model has been 'augmented' by  $\Delta X_{t-j}$ . In this case the regression model and the t- test are referred as the ADF test.

#### **3.4.4 Cointegration**

Cointegration is an econometric concept which mimics the existence of a long-run equilibrium among economic time series. If two or more series are themselves nonstationary, but a linear combination of them is stationary, then they are said to be cointegrated (Wei, 2006).

If the non-stationary time series tend to revert to a common long term trend, they are said to be cointegrated. Cointegration, thus, means long run relationship between variables. In the short run, the variables may drift apart, but pulled back to the long run equilibrium.

Nonstationary is a property common to many applied time series. This means that a variable has no clear tendency to return to a constant value or linear trend. It is generally correct to assume that economic processes have been generated by a nonstationary process and follow stochastic trends. One major objective of empirical research in

economics it to test hypotheses and estimate relationships derived from economic theory, among other such aggregated variables (Pfaff, 2008).

Consider we have two  $I(1)$  variables,  $y_t$  as dependent and  $x_t$  as explanatory variable, for simplicity without a constant. Generally, if we make a linear combination out of them,

$$y_t = \alpha x_t + u_t$$

$$\text{Or, } u_t = y_t - \alpha x_t$$

The combination  $u_t$  will normally still be  $I(1)$ , since they both have infinite variance. However, if the constant  $\alpha$  is therefore such that the bulk of the long run components of  $y_t$  and  $x_t$  cancel out, the combination could be  $I(0)$ , more precisely, the difference  $u_t$  would be  $I(0)$ . If a linear combination of  $I(1)$  variables is stationary, then the variables are said to be cointegrated.

#### **3.4.4.1 Engle Granger Cointegration Test**

Engle & Granger (1987) suggest a cointegration test, which consists of estimating the cointegration regression by OLS, obtaining the residual  $\hat{u}_t$  and applying unit root test for  $\hat{u}_t$ . The prerequisite for Engle Granger cointegration test is that all variables should be integrated of order one or  $I(1)$ .

The Null and Alternate Hypothesis in Engle-Granger Cointegration test are as followings:

Null Hypothesis ( $H_0$ ): Residual series has a unit root

Alternative Hypothesis ( $H_1$ ): Residual series has not unit root

Since  $U_t$  is the estimated value, we cannot rely on normal augmented dickey fuller critical value to perform significance test. Engle & Yoo (1987) critical values or corrected MacKinnon critical values is used to either accept or reject null hypothesis.

### **3.4.5 Error Correction Model**

When two variables are cointegrated i.e., there is long run relationship between them there may be disequilibrium in the short run. The error term in the cointegrated regression equation is called equilibrium error term. This error can be used to tie the short run behavior of dependent variable to its long run value. The error correction model (ECM) first introduced by Sargan (1984). An Error Correction Model for two variables X and Y which are cointegrated can be represented as:

$$\Delta Y_t = \alpha + \beta \Delta X_t + \gamma U_{t-1} + \varepsilon_t$$

The speed of adjustment in Error Correction Model denoted by  $\gamma$  gives us how much the long-term disequilibrium of previous period has been corrected. This has a very good economic interpretation.

### **3.5 Specification of Model**

Finding the impact of worker's remittances inflows on price level in Nepal is the main objective of the study. For achieving the objective, the study uses the following model as explained below.

#### **3.5.1 Model: Multiple Regression Analysis**

Multiple regression analysis is a widely employed tool in Economics, which studies relationship between dependent and independent variables of the interests. For the purpose of our study, Consumer Price Index of Nepal is our dependent variables whereas others are independent variables. We are particularly interested in whether the

remittances inflows and inflation bears any significant relationship when others variables in the model are controlled for. Before performing regression analysis in time series-data, stationarity of data sets are first confirmed through Augmented-Dickey Fuller (ADF) test.

$$\ln \text{CPIN} = \alpha + \mu \ln (\text{CPII}) + \beta \ln (\text{M2}) + \gamma \ln \text{Rm} + \xi \ln \text{GDP} + \epsilon \ln \text{RD} + u$$

Where,

CPIN= Consumer Price Index of Nepal

CPII= Consumer Price Index of India

M2= Broad Money Supply in Nepal

Rm= Remittance Inflows in Nepal

GDP= Real Gross Domestic Product of Nepal

RD= Budget Deficit/Revenue Deficit

$\alpha, \beta, \gamma, \xi, \epsilon$  and  $\mu$  are usual regression parameters

In case any cointegration relationship is found among the variable of the model, we determine long-term relationship using Error Corrected Model (ECM). If no cointegrating relation is found, we proceed with short-term relationship estimation. For ascertaining cointegration test, we use Engle-Granger Cointegration Test.

The study uses multiple regression analysis for ascertaining the impact of remittance inflows in price level of Nepal. Consumer Price Index of Nepal (CPIN) is the dependent variables of the study. Independent variables includes Remittance Inflows( Rm), Broad Money Supply(M2),Consumer Price Index of India (CPII), Real GDP of Nepal

(RGDP) and Revenue Deficit (RD). All the variables used in the study are transformed to natural logarithm form. One advantages of transforming variables into natural logarithm form is that the coefficients in regression analysis can be interpreted as elasticity coefficient. Also, any outliers in data series are remedied when taken in natural logarithm form.

### **3.6 Diagnostic Test**

#### **3.6.1 Serial Correlation Test (Breusch-Godfrey Test)**

Breusch-Godfrey test is commonly used test for the presence of serial autocorrelation in model. This test is also known as LM test for serial correlation. The Breusch-Godfrey is a test for autocorrelation in the errors in a regression model. It makes use of the residuals from the model being considered in a regression analysis, and a test statistics is derived from these.

The null and alternate hypothesis of the model are:

Null Hypothesis: There is no serial correlation of any order up to  $p$

Alternate Hypothesis: There is serial correlation

#### **3.6.2 Heteroscedasticity Test (Breusch-Pagan-Godfrey Test)**

The Breusch-Pagan-Godfrey Test (sometimes shorted to the Breusch-Pagan test) is a test for heteroscedasticity of errors in regression. The null and alternate hypothesis in this test are:

Null Hypothesis: Error variance are all equal (Homoscedasticity)

Alternate Hypothesis: Error variance are not equal (Heteroscedasticity)

A large chi-square would indicate that heteroscedasticity was present

### **3.6.3 Jarque-Bera Test**

Jarque-Bera test is a goodness-of-fit test of whether sample data have the skewness and kurtosis matching a normal distribution. The test is named after Carlos Jarque and Anil K Bera. The test statistics is always nonnegative. If it is far from zero, it signals the data do not have a normal distribution.

The Jarque-Bera test uses these two (statistical) properties of the normal distribution, namely:

- 1) The Normal distribution is symmetric around its mean (skewness = zero)
- 2) The Normal distribution has kurtosis three, or Excess kurtosis = zero

The Jarque-Bera test tests the hypothesis:

$H_0$ : Data is normal

$H_1$ : Data is NOT normal

As a diagnostic test Jarque-Bera Test is used to test the null and alternate hypothesis as followings:

Hypotheses:  $H_0$ : The error term is normally distributed,

$H_1$ : The error term is not normal distributed

## **3.7 Variables Used in the Study**

### **Consumer Price Index**

A price index is a measure of the proportionate, or percentage, changes in a set of prices over time. A consumer price index (CPI) measures changes in the prices of goods and services that households consume. Such changes affect the real purchasing power of consumers' incomes and their welfare. As the prices of different goods and services do

not all change at the same rate, a price index can only reflect their average movement. A price index is typically assigned a value of unity, or 100, in some reference period and the values of the index for other periods of time are intended to indicate the average proportionate, or percentage, change in prices from this price reference period. Price indices can also be used to measure differences in price levels between different cities, regions or countries at the same point in time. Consumer Price Indexes are used to measure inflation by formula below:

$$\text{Inflation} = \frac{CPI_t - CPI_{t-1}}{CPI_t}$$

Consumer Price Index of Nepal and India are used in this study.

### **Real GDP**

Real gross domestic product is a macroeconomic measure of the value of economic output adjusted for price changes. Real gross domestic product is an inflation-adjusted measure that reflects the value of all goods and services produced by an economy in a given year, expressed in base-year prices

### **Broad Money Supply (M2)**

Broad money is a measure of the money supply that includes more than just physical money such as currency and coins (also known as narrow money). It generally includes demand deposits at commercial banks, and any monies held in easily accessible accounts.

In Nepal,

$$\text{BROAD Money} = M1 + TD$$

$$M1 = CC + DD$$

M2 is the broader monetary aggregate compiled in Nepal. Besides M1, it includes time deposit (TD) held at commercial banks. M1, also known as narrow money includes Currency in Circulation (CC) and Demand Deposit (DD). Time Deposit (TD), on the other hand, consists of savings deposits, fixed deposits and margin deposits with commercial banks.

### **Workers's Remittance**

The total income received by Nepalese migrant workers abroad. Although several informal channels are also used in parallel to send money by migrant workers, the data used in the study are remittance inflows through formal channels.



## **CHAPTER IV**

### **DATA ANALYSIS**

This chapter presents the analysis of data with the estimated results. In section 4.1, the status and trend of worker's remittance inflows in Nepal are discussed. In section 4.3, stationary test of variables used in the model and conclusions that follow are discussed. Cointegration test following Engle-Granger two step Procedure is conducted and conclusion about the non- stationary of residuals or no cointegrating relationship is discussed in section 4.4. In section 4.5, the results of short-run estimate is displayed and discussed. Furthermore, presence of serial correlation in the model is checked using Breusch-Godfrey test. The Breusch-Godfrey-Pagan test is used to test the heteroscedasticity of the residual term. Jerque-Bera test checks for the presence of normality in the error term series. Also, CUSUM and CUSUM of Squares tests the stability of the short-run coefficients in our model.

#### **4.1 Status of Remittance Inflows in Nepal**

This section discusses the recent trend and status of worker's remittance inflows in Nepal. The volume of worker's remittance inflows and its size compared to GDP are also discussed. The section also makes comparisons of worker's remittances inflows with other macroeconomic variables: Saving and Investment. Finally, the section discusses the recent trend of worker's remittance as percentage of foreign exchange earnings in Nepal.

##### **4.1.1 Recent Trend of Remittance Inflows in Nepal**

Remittance inflow has become a major component of Nepalese economy in recent years. The size of worker's remittance inflows has grown to become about one-third of the size of the national economy. According to Nepal Rastra Bank, Nepal received Rs

695452.4 million as worker's remittance in 2016/17 which was about 25% of the country GDP. Because of large size of remittance inflow it has become a major source of foreign exchange earnings in Nepal. Despite widening trade deficit Nepal still has current account surplus because of the growing remittances. Even with the widening export import gap and with mounting burden of debt servicing, it appears that remittance is saving the country from balance of payment crisis. Several studies have established that remittance inflows have brought positive changes in health, education, social and other sectors in Nepal.

**Table 4.1: Worker's Remittance Inflow in Nepal for Period 2000-2016.**

Year	Workers' Remittance Inflows(in Million Rs)	% Increase
2000/01	47216.6	
2001/02	47536.3	0.68
2002/03	54203.3	14.03
2003/04	58587.6	8.09
2004/05	65541.2	11.87
2005/06	97688.5	49.05
2006/07	100144.8	2.51
2007/08	142682.7	42.48
2008/09	209698.5	46.97
2009/10	231725.3	10.50
2010/11	253551.6	9.42
2011/12	359554.4	41.81
2012/13	434581.7	20.87
2013/14	543294.1	25.02
2014/15	617278.8	13.62
2015/16	665064.3	7.74
2016/17	695452.4	4.57

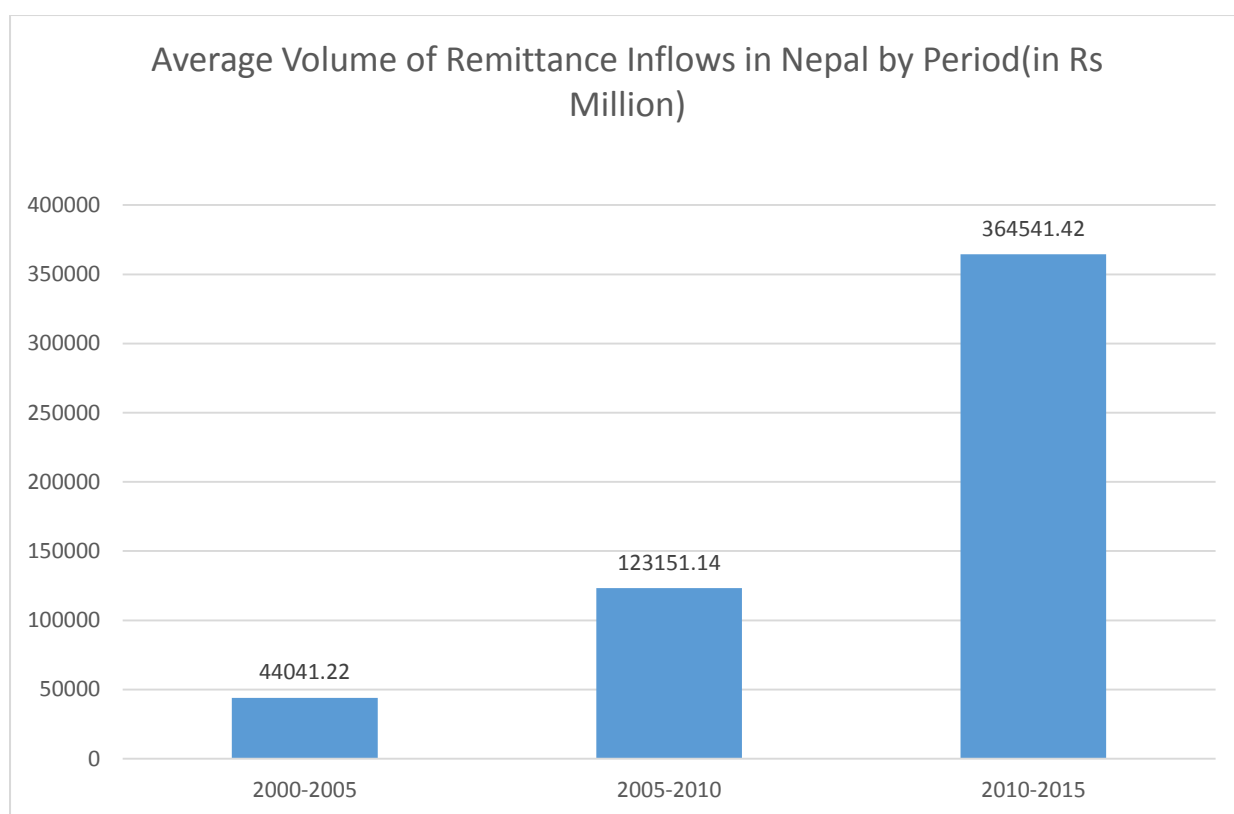
**Source: Nepal Rastra Bank**

Table 4.1 presents the total workers' remittance received in Nepal for the period between 2000-2017. Remittance inflows in Nepal has increased steadily over the period. Worker's remittance inflows which was Rs 47216.6 million in 2000/01 increased to 695452.4 in 2016/17. For most of the period between 2000/01 to 2016/17 in Nepal it is observed that there was double digit growths in worker's remittance inflows. Many domestic and international changes can explain this increase in remittance inflows in Nepal. First of all, Nepal adopted deregulation and liberalization policies during 1990s because of which Nepal was integrated more than ever with international market. Nepalese workers began to move to international market for job opportunities which was scarce in their home country. Another factor is the civil war that Nepal underwent during 1996-2005, which saw mass exodus of Nepalese workers preferring foreign labour market. (THAGUNNA, 2013). According to Economic Survey, 2017, about 4.30 million youths have gone abroad in foreign employment through formal and informal way. The number of countries opened for foreign employment to Nepalese workers were 110.

#### **4.1.2 Average Volume of Worker's Remittance Inflows in Nepal by Period**

Average remittance inflows in Nepal for each of the successive five years between 2000-2015 is presented in the bar graph 4.1. The average volume of worker's remittance inflows which was Rs 44041.22 million in 2000-2015 rose to Rs 123151.14 million in 2005-10. Similarly, the average volume of worker's remittance inflows in 2010-2015 was Rs 364541.42 million in 2010-2015. This shows that worker's remittance inflows are steadily increasing over time in Nepal and reflects the structural change Nepalese economy.

**Figure 4.1: Average Volume of Remittance Inflows in Nepal by Period**



**Source: Nepal Rastra Bank**

### **4.1.3 Size of Remittance Inflows in Nepal**

Not only has the volume of worker's remittance inflows increased in Nepal but its size in comparison to the economy has also increased over time. The increasing volume of remittances and its contribution to the national economy in the recent years is reflected in the increasing remittance to GDP ratio. The remittance to GDP ratio which was 10.7 in 2000/01 increased to 29.6 in 2015/16. The remittance to GDP ratio has declined in recent years but the actual volume of remittance income has continued to increase.

Table 4.2 shows the share of worker's remittance inflows in GDP of Nepal. Compared to the size of economy, remittance inflow is a major component of Nepalese economy. Worker's Remittance inflows which was small portion of the economy, has grown to

become nearly one-third of the country's GDP. During the 1990 when Nepal opened up to international community through liberalization and adopting value of globalization, remittance inflows in Nepal was a mere 1.77% of the Country's GDP. Increase in the trend of Nepalese labour force opting for foreign employment in recent decades, compounding with the low economic growth in the country are some factors, among others, for this structural shift in the economy. In 2018, Nepal was ranked fifth in list of countries with high remittance income to GDP ratio.

**Table 4.2: Remittance to GDP Ratio for Period 2000/01 -2016/17.**

Year	Remittance to GDP ratio in Nepal (in %)
2000/01	10.7
2001/02	10.3
2002/03	11.0
2003/04	10.9
2004/05	11.1
2005/06	14.9
2006/07	13.8
2007/08	17.5
2008/09	21.2
2009/10	19.4
2010/11	18.5
2011/12	23.5
2012/13	25.6
2013/14	27.7
2014/15	29.0
2015/16	29.6
2016/17	26.8

**Source: Nepal Rastra Bank**

#### **4.1.4 Workers Remittance in Saving and Investment**

The ratio of remittances to saving and investment is increasing with higher rate of growth of remittances. This shows that Nepal's dependency on foreign aid for filling

the saving investment gap can be lessened to a greater extent through strategic plans and programs for mainstreaming the incoming remittance to financial system and for their productive use.

**Figure 4.2: Ratio of Remittance to Saving and Investment in Nepal (in %)**



**Source: Nepal Rastra Bank**

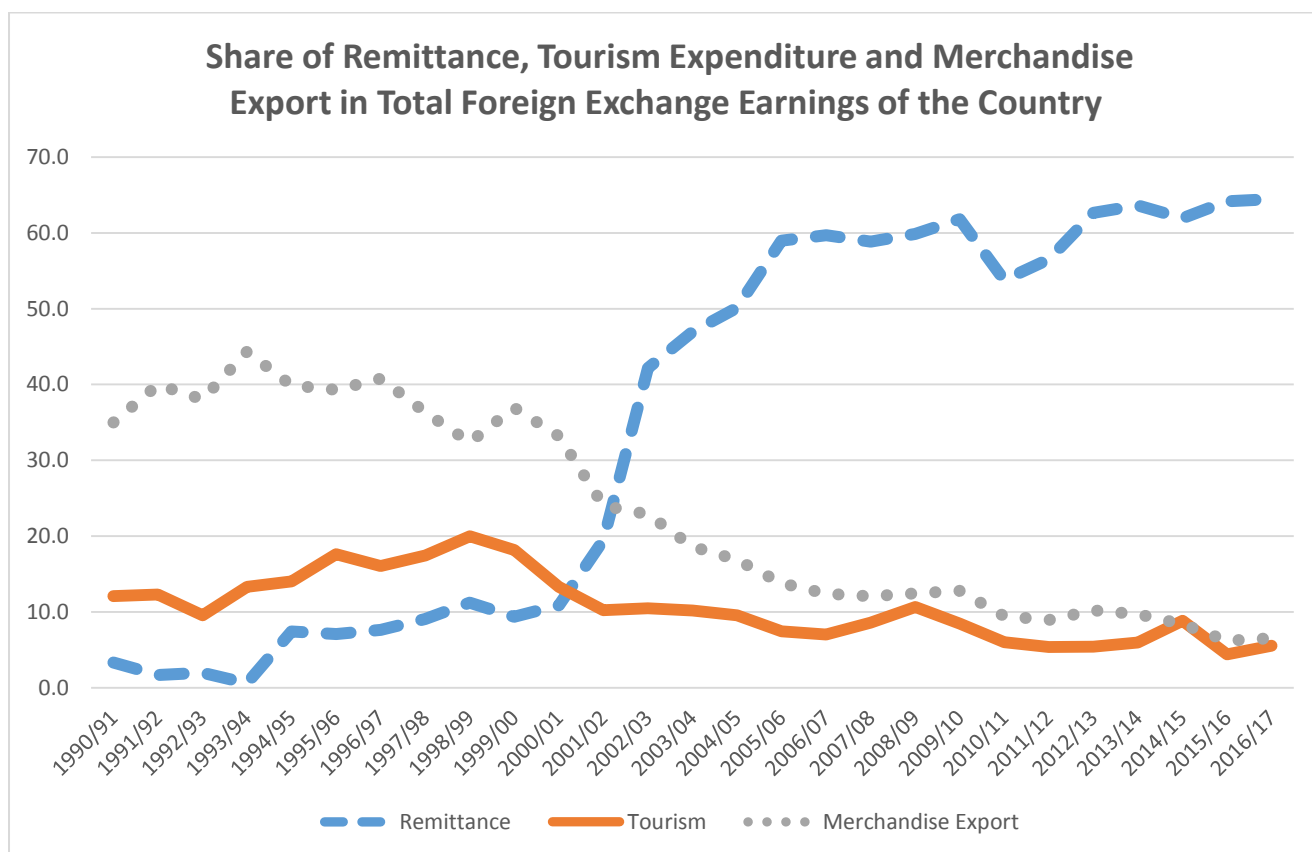
Figure 4.2 shows ratio of remittance inflows to saving and investments in Nepal. Gross Domestic Savings is taken as an indicator of saving in Nepal. Similarly, Gross Fixed Capital Formation (GFCF) is taken as an indicator of investment in Nepal. As shown in the figure, the remittance share in Saving and Investment has increased continuously from 2000/01 to 2015/16.

#### 4.1.5 Worker’s Remittance in Foreign Exchange Earnings

Remittance has relaxed the foreign exchange constraint of the country. The share of remittance in total foreign exchange increased quite considerably over the years from

less than 2 percent in 1991/92 to more than 60 percent in 2005/06. Higher growth of convertible currency reserves of the banking system in the recent years has allowed NRB to build the official reserve to higher level reducing its vulnerability to external shocks (Pant, 2006).

**Figure 4.3: Share of Remittance, Tourism Expenditure and Merchandise Export in Total Foreign Exchange Earnings of the Country**



**Source: Nepal Rastra Bank**

Remittances have surpassed the export as the top contributor in terms of foreign exchange earnings, particularly after 2000/01. Similarly, the share of travel receipts in the total foreign exchange earning went down drastically with the rapid rise in the remittances and slow growth of tourism industry.

## 4.2 Variables Used in the Model

**Table 4.3: Summary of Variables Used in the Study**

Date: 11/05/19 Time: 07:47						
Sample: 1 43						
	LNCPII	LNCPIN	LN M2	LNRD	LNRGDP	LNRM
Mean	3.511581	3.450494	11.33244	8.361798	13.48518	9.097107
Median	3.630859	3.623975	11.43661	8.328258	13.51908	8.529714
Maximum	5.049503	5.073748	14.76783	11.64616	14.38807	13.45232
Minimum	2.002914	1.752057	7.632595	6.117216	12.63051	5.319590
Std. Dev.	0.952904	1.025305	2.115545	1.467195	0.548060	2.709653
Skewness	-0.098874	-0.193403	-0.107820	0.514225	-0.034526	0.213970
Kurtosis	1.772219	1.829700	1.802135	2.626635	1.722129	1.626476
Jarque-Bera	2.770905	2.721937	2.654142	2.045063	2.934255	3.708214
Probability	0.250211	0.256412	0.265253	0.359683	0.230587	0.156593
Sum	150.9980	148.3713	487.2948	342.8337	579.8626	391.1756
Sum Sq. Dev.	38.13706	44.15250	187.9723	86.10643	12.61555	308.3732
Observations	43	43	43	41	43	43

### Source: Author's Calculations Using Eviews

All the variables in the study are taken in natural logarithm form. There are several advantages of taking macroeconomic variables in natural logarithm form. One such advantage is that the effects of data outliers can be minimized. Also, taking data in natural logarithm form can convert non-stationary data into stationary one which is the must in time series regression.

Table 4.3 gives the description of the variables that are used in the study. All the variables are taken in natural logarithm form. LNCPIN is the consumer price index of Nepal in natural logarithm form, LNCPII is the consumer price index of Nepal in natural logarithm form, LN M2 is the Broad Money Supply in Nepal taken in natural logarithm form, RGDP is the real GDP of Nepal taken in natural logarithm form, LNRM is the remittance inflows in Nepal in natural logarithm form, LNRD is the revenue deficit or budget deficit in Nepal in natural logarithm form.



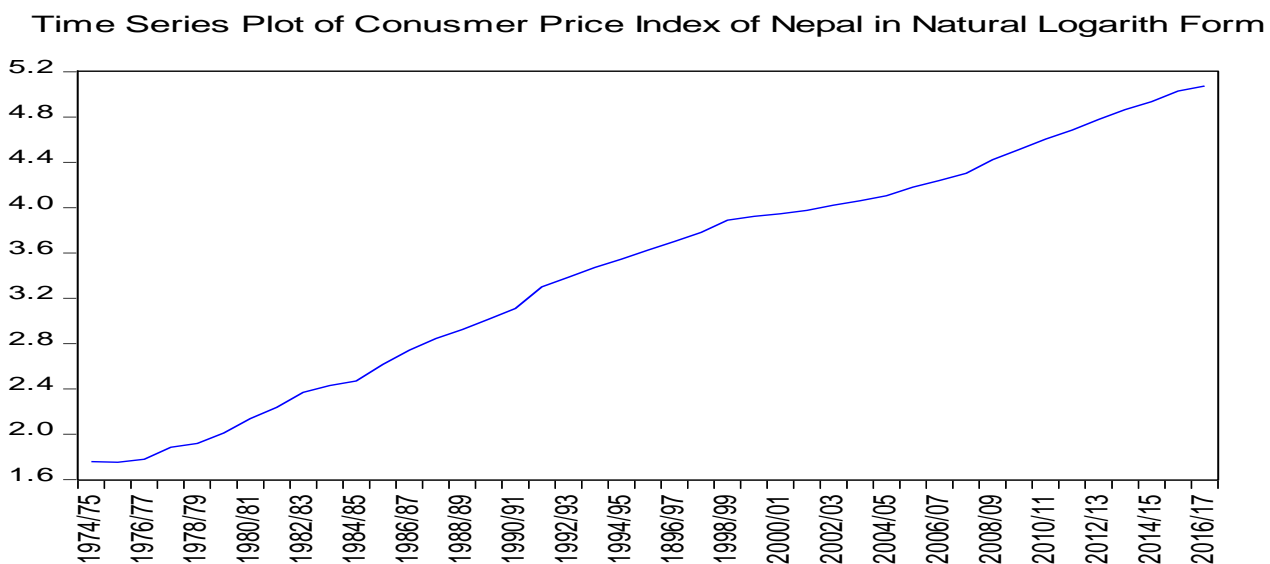
### **4.3 Stationary Test of Variables**

One of the underlying assumption in time series analysis is that the variables needs to be stationary. A time series variable is said to stationary if its mean and variance are independent of time. In contrast, non-stationary series is one whose statistical properties changes over time. If non-stationary time series data are used in regression analysis, the result will be spurious regression.

Unit root test are often employed to check the stationary property of time-series data. Augmented Dickey-Fuller Test (ADF) is common and widely employed test of stationary in time series data. ADF can also test the order of integration of variables. If a variable needs to be differenced once to make it stationary then the variable is said to be integrated of order one and is represented as  $I(1)$ . Similarly, if a variable needs to be differenced twice than it is  $I(2)$ . Stationary time series variable are denoted as  $I(0)$ .

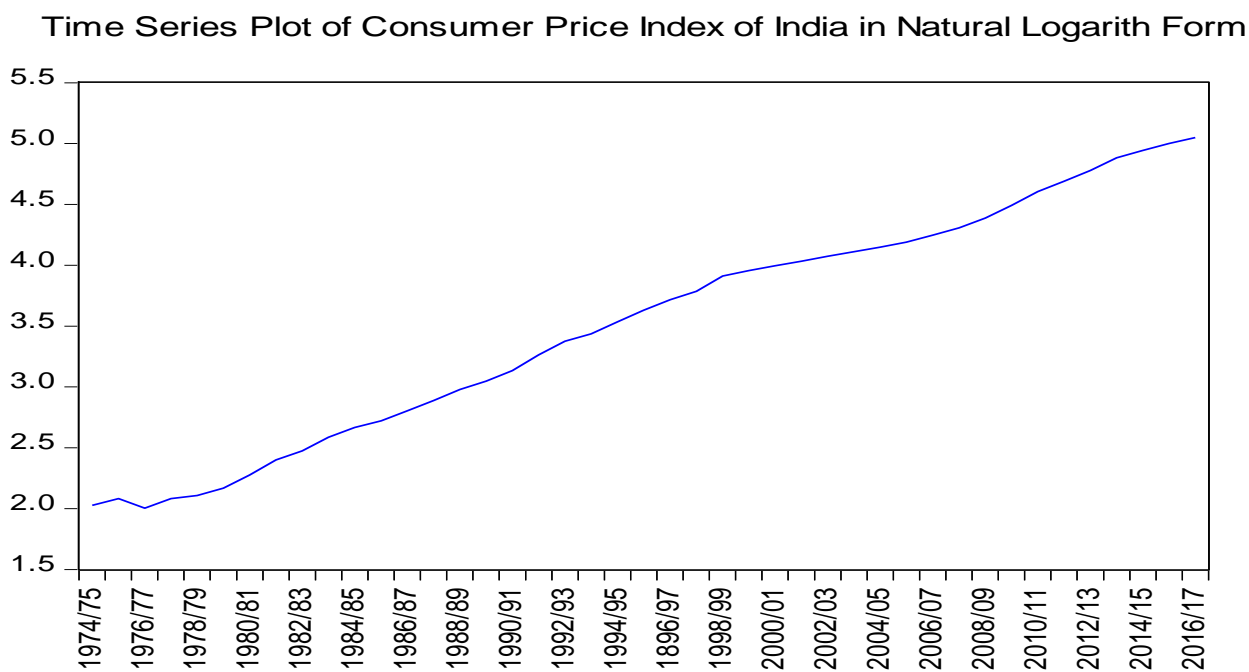
Before conducting the ADF test, an attempt is made on whether to include the trend as a variable in the ADF regression or not. The time series plots of the variables have been presented.

**Figure 4.4: Time series plot of Consumer Price Index of Nepal**



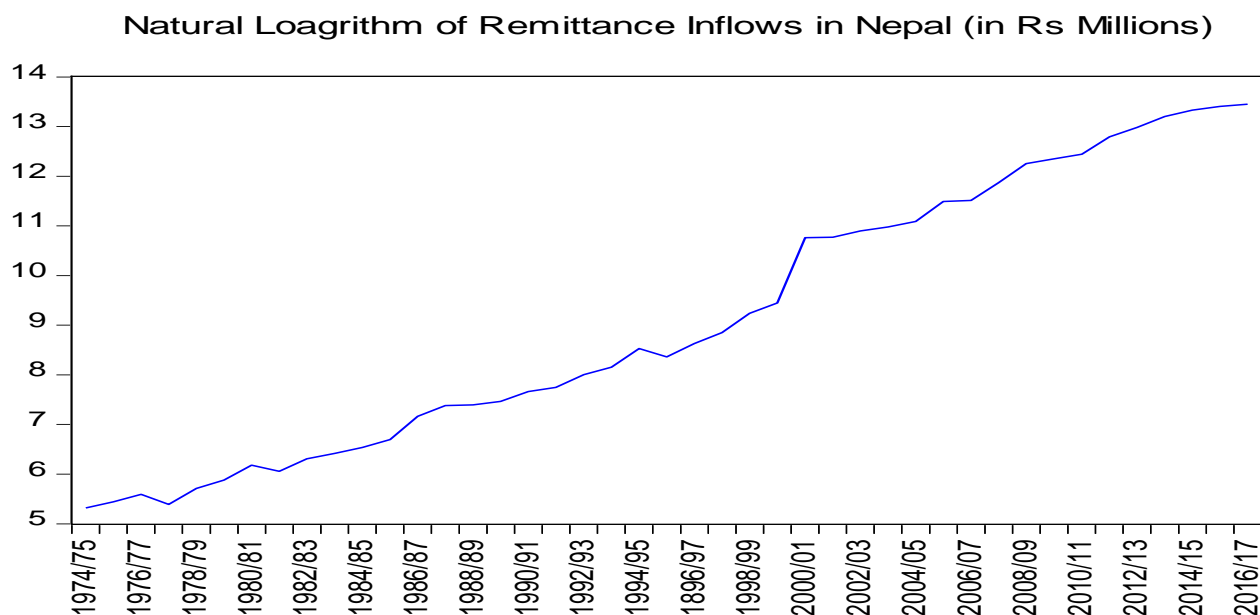
Source: Nepal Rastra Bank

**Figure 4.5: Time Series Plot of Indian Consumer Price Index of India**



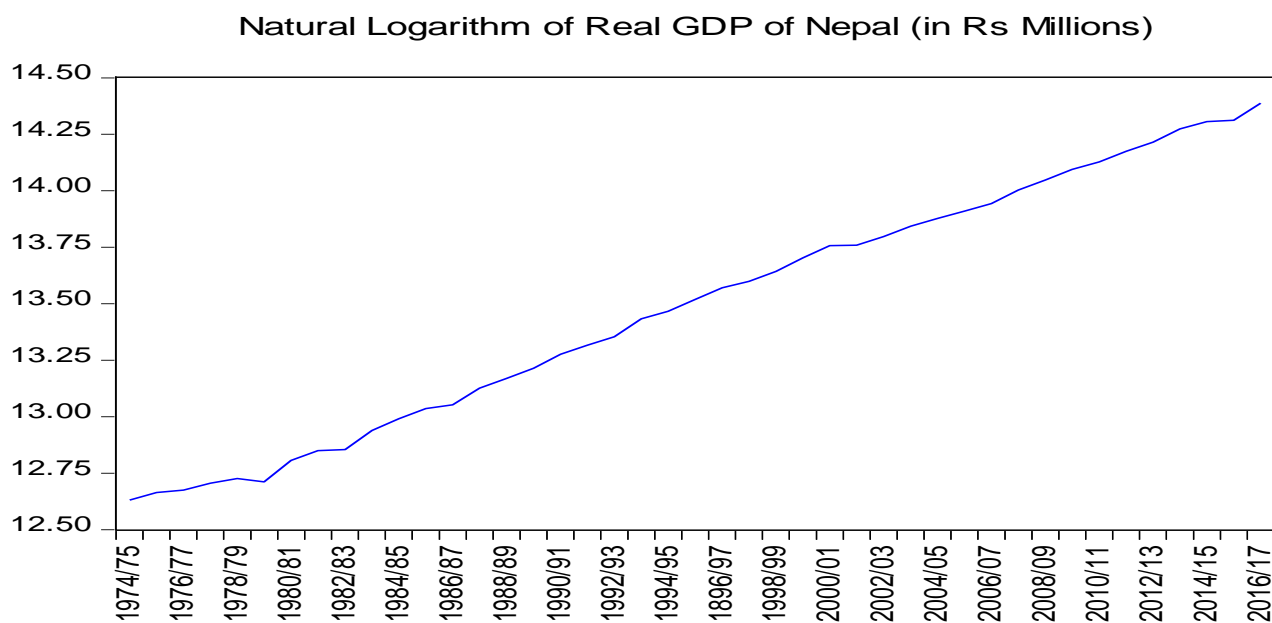
Source: Nepal Rastra Bank

**Figure 4.6: Time Series Plot of remittances inflows in Nepal**



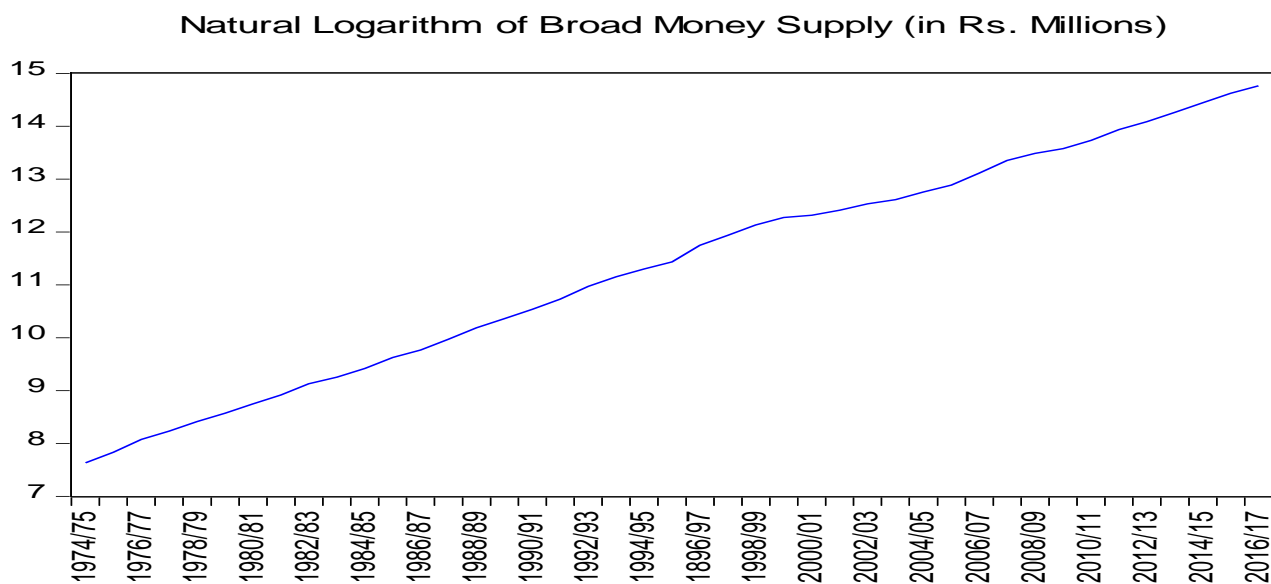
Source: Nepal Rastra Bank

**Figure 4.7: Time Series Plot of Real GDP of Nepal**



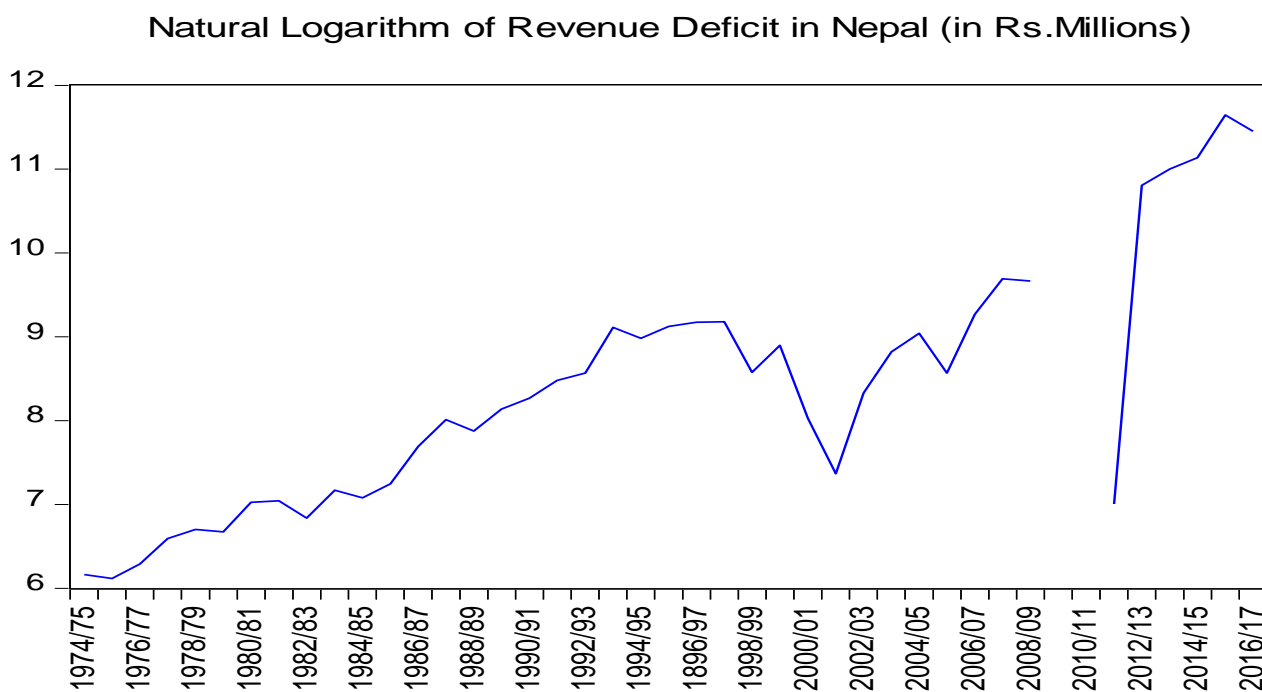
Source: Nepal Rastra Bank

**Figure 4.8: Time Series Plot of Broad Money Supply in Nepal**



Source: Nepal Rastra Bank

**Figure 4.9: Time Series Plot of Budget Deficit in Nepal**



Source: Nepal Rastra Bank

The conclusions of the Augmented Dickey Fuller (ADF) test is presented in Table 4.4 below. The result indicates that all the variables are non-stationary at their level form or ln level form. However when they are differenced once all the variables becomes stationary (See Appendices I-VI). This means that all the variables ln CPII, ln CPIN, ln RGDP, ln RM, ln M2 and Ln RD are integrated of order 1 i.e., I(1).

**Table 4.4: Augmented Dickey Fuller Test Results**

<b>Time Series Variables</b>	<b>At Level Form</b>	<b>First Difference</b>	<b>Conclusions</b>
ln M2	Unit Root	No Unit Root	I(1) at 5% Level of Significance
ln RM	Unit Root	No Unit Root	I(1) at 5% Level of Significance
ln CPII	Unit Root	No Unit Root	I(1) at 5% Level of Significance
ln CPIN	Unit Root	No Unit Root	I(1) at 5% Level of Significance
ln RGDP	Unit Root	No Unit Root	I(1) at 5% Level of Significance
Ln RD	Unit Root	No Unit Root	I(1) at 5% Level of Significance

**Source: Author's Construction**

#### **4.4 Cointegration Test: Engle-Granger Methodology**

The ADF test showed that none of the variables in our model are integrated of order zero i.e. I(0). However, all of the variables are integrated of order 1 i.e., I(1). Therefore, we can use cointegration test to determine if there exists long run relationship between the variables. Cointegration test is based on the premise that while individual series might not be stationary at their level form, the linear combination of these non-stationary series might be stationary.

To test the cointegration relationship between the variables we use Engle-Granger (EG) or Augmented Engle-Granger (AEG) test. To perform this test one should first find out the residual of model and then check the Augmented Dickey-Fuller (ADF) unit root test to see whether the residual contains unit root or not.

The Engle-Granger (EG) test carried out based on the estimated equation 1, which result is shown in table 4.5 below. In the model natural logarithm of Consumer Price Index of Nepal (CPIN) has been kept as dependent variable and all other variables as independent variables. The residual term series generated from it was checked for the presence of unit root by running ADF test. Since the non-stationary time series data can give rise to spurious regression, we cannot rely on Augmented Dickey Fuller Critical values to test whether the residual is stationary not. Therefore we use the critical value table for residual based cointegration test.

**Table 4.5: Engle-Granger Cointegration Test Result**

$$\ln \text{CPIN} = \alpha + \mu \ln (\text{CPII}) + \beta \ln (\text{M2}) + \gamma \ln \text{RM} + \xi \ln \text{RGDP} + \ln \text{RD} + u \text{ -----(1)}$$

Null Hypothesis: RESID01 has a unit root  
 Exogenous: None  
 Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
<b>Augmented Dickey-Fuller test statistic</b>	<b>-3.691471</b>	<b>0.0005</b>
Test critical values:		
1% level	-2.628961	
5% level	-1.950117	
10% level	-1.611339	

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

**Source: Author's Calculations Using Eviews**

Table 4.5 displays the stationary test for residuals obtained from equation (1) which is presented in Appendix VII. The absolute calculated critical value is smaller than the critical value of 4.43 for residual based cointegration test at 10% level of significance,

therefore we cannot reject null hypothesis of residuals series having unit root. Therefore it cannot be said anything about long-term relationship between CPI of Nepal, CPI of India, RGDP, M2 , Remittance inflows in Nepal and Revenue Deficit. In other words, the macroeconomic variables in our model are not cointegrated.

#### 4.5 Evaluation of Estimates: Short-Run Relationship

Since there is no cointegrating relationship among I (1) variables of our model, the short-term relationships among variables are estimated by differencing the series once and running OLS on them.

**Table 4.6: Result of Regression Analysis**

Dependent Variable: D(LNCPIN)

Method: Least Squares

Date: 11/05/19 Time: 07:18

Sample (adjusted): 2 43

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNCPII)	0.673469	0.151218	4.453643	0.0001
D(LNM2)	0.155572	0.108054	1.439767	0.1594
D(LNRD)	0.005746	0.007667	0.749425	0.4589
D(LNRGDP)	-0.339127	0.239561	-1.415617	0.0663
D(LNRM)	0.009089	0.022993	0.395296	0.6952
C	0.015834	0.023417	0.676185	0.5036
R-squared	0.420414	Mean dependent var		0.078260
Adjusted R-squared	0.332599	S.D. dependent var		0.038774
S.E. of regression	0.031677	Akaike info criterion		-3.925845
Sum squared resid	0.033112	Schwarz criterion		-3.669912
Log likelihood	82.55397	Hannan-Quinn criter.		-3.834018
F-statistic	4.787448	Durbin-Watson stat		2.129470
Prob(F-statistic)	0.002124			

#### Source: Author's Calculations

The result of the regression analysis using OLS is shown in Table 4.6. All variables are in first natural logarithm difference form. Therefore the regression result represents the short-term relationship among variables. From Table 4.6, we see that all variables have expected sign.

From the regression result we see that the short run relationship between LNCPIN (Consumer Price Index of Nepal) and LNRM (Remittance) is positive but not significant. Therefore we conclude that remittance inflows does not cause inflationary pressure in Nepal in short-run.

The study also finds the significant and positive relationship between Consumer Price Index of Nepal (CPIN) and India (CPII). This means inflationary pressure in India effects the price level in Nepal. This is due to the fact that India is the largest trading partner of Nepal.

The relationship between Money Supply and Consumer Price Index of Nepal is found positive. However, the coefficient is not significant at 5% level of significance. A similar conclusion regarding the significance of M2 on Consumer Price Index (CPI) of Nepal was reached in a study conducted by Monetary Division of Nepal Rastra Bank (2001). This does not mean however that money supply is not the determining factor of inflation in Nepal. The same study found narrow money supply to be significant determinant of inflation in Nepal in short-run.

The relationship between real GDP and Consumer Price Index of Nepal is found negative and significant from our regression analysis. This shows that when the economy is growing in real terms it exerts negative pressure in the price level.

The relationship between Revenue Deficit (LNRD) and Consumer Price Index of Nepal (CPIN) is positive but not significant. The expected positive sign shows that revenue deficit and price level are positively related. However, the coefficient is not significant.

In table 4.6 we see that the value of R-squared is 0.42. This means that about 42% of total variation in inflation is explained by explanatory variable and remaining is due to



error. Likewise, the probability value of F-statistic is less than 1 percent that shows that there is overall significant of short run model. The Durbin-Watson Statistics the model is 2.12 which means there is no autocorrelation in our model.

#### 4.6 Diagnostic Test of the Model

##### 4.6.1 Serial Correlation Test

For testing the presence of serial correlation that has been included in our model, we use Breusch-Godfrey test. Presence of serial correlation means incorrect conclusions would be drawn from other tests, or that sub-optimal estimates of model parameters are obtained if it is not taken into account. Because the test is based on the idea of Lagrange multiplier testing, it is sometimes referred to as LM test for serial correlation. Whereas the Durbin-Watson Test is restricted to detecting first-order autoregression, the Breusch-Godfrey (BG) Test can detect autocorrelation up to any predesignated order  $p$ .

**Table 4.7: Breusch-Godfrey Serial Correlation LM Test**

Breusch-Godfrey Serial Correlation LM Test:  
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.760157	Prob. F(2,31)	0.4761
Obs*R-squared	1.823236	Prob. Chi-Square(2)	0.4019

**Source: Author's Calculations Using Eviews**

Table 4.7 shows the results of the Breusch-Godfrey Serial Correlation LM Test for the residuals of our model using two number of lags. The null hypothesis of no serial correlation cannot be rejected based on our finding. This means there is no autocorrelation in our model.

#### 4.6.2 Breusch-Pagan-Godfrey Test

To test the heteroscedasticity, Breusch-Pagan-Godfrey Test has been performed. The result of heteroscedasticity of heteroscedasticity test is presented in table 4.8.

**Table 4.8: Breusch-Pagan-Godfrey Test**

Heteroskedasticity Test: Breusch-Pagan-Godfrey  
Null hypothesis: Homoskedasticity

F-statistic	0.453418	Prob. F(5,33)	0.8077
Obs *R-squared	2.507055	Prob. Chi-Square(5)	0.7754
Scaled explained SS	2.679390	Prob. Chi-Square(5)	0.7493

**Source: Author's Calculation Using Eviews**

Table 4.8 shows that the observed R-squared statistics is equal to 2.50 and corresponding probability is 80 percent. Here, the probability value of observed R-squared is greater than 5 percent so we cannot reject the null hypothesis that there is homoscedasticity. Therefore, the result indicate that the model in free from heteroscedasticity.

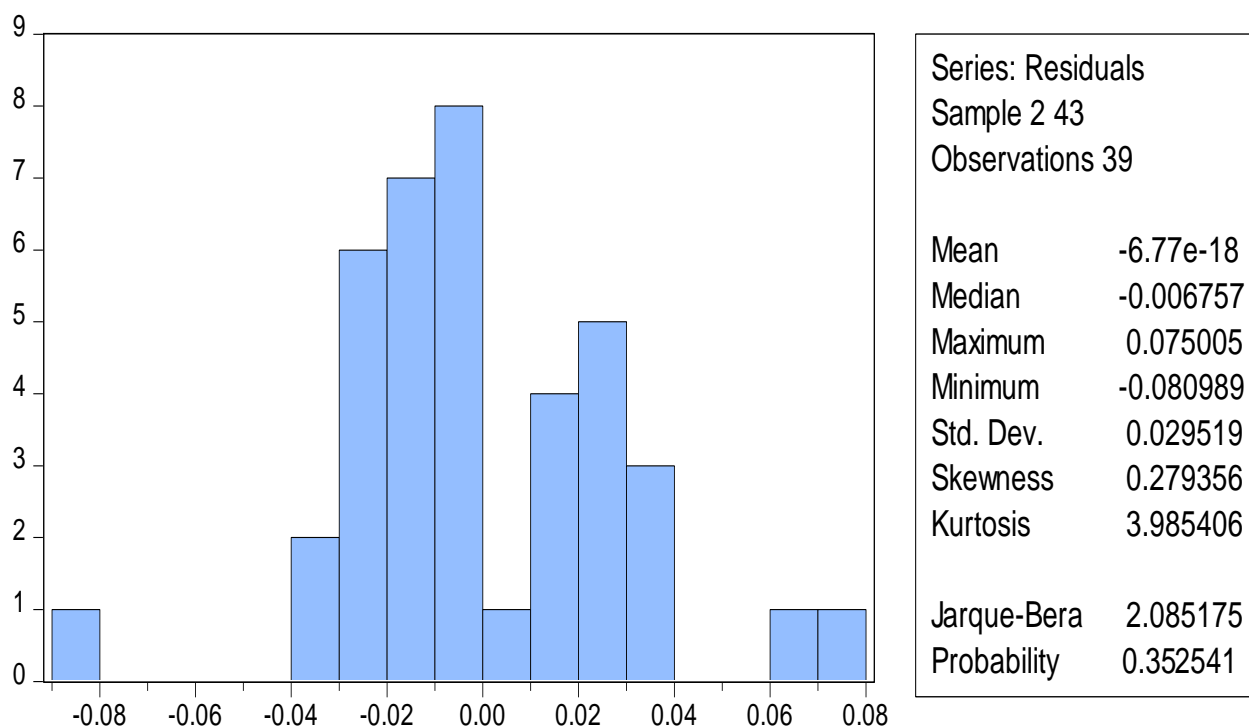
#### 4.6.3 Jerque-Bera Test

To test whether the residuals are normally distributed or not, we used Jarque-Bera (J-B) test under the following hypothesis.

Null Hypothesis (H0): The residuals are normally distributed

Alternative Hypothesis (H1): Residuals are not normally distributed

**Figure 4.10: Jerque-Bera Test of Normality**



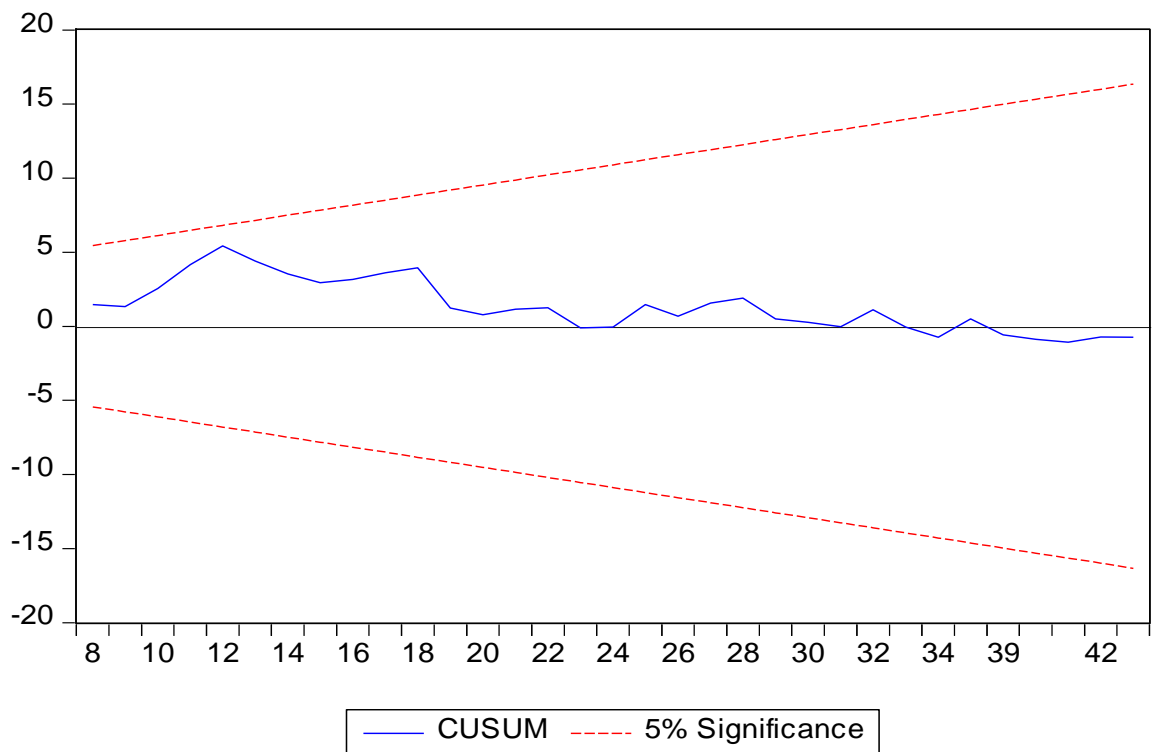
**Source: Author's Calculation Using Eviews**

The result of Jarque-Bera (J-B) test is presented in figure 4.10. The probability value is greater than 5 percent so the null hypothesis of residuals are normally distributed cannot be rejected. Hence, the residuals are normally distributed.

#### **4.7 Stability Test**

The Cumulative Sum (CUSUM) graphs and Cumulative Sum of Squares (CUSUM of Squares) has been used to test the stability of the short-run coefficient. The result shows that the coefficient the regression model lies within the critical limit and indicate stability in the coefficients over the sample period. It is shown in the figure 4.11 and 4.12.

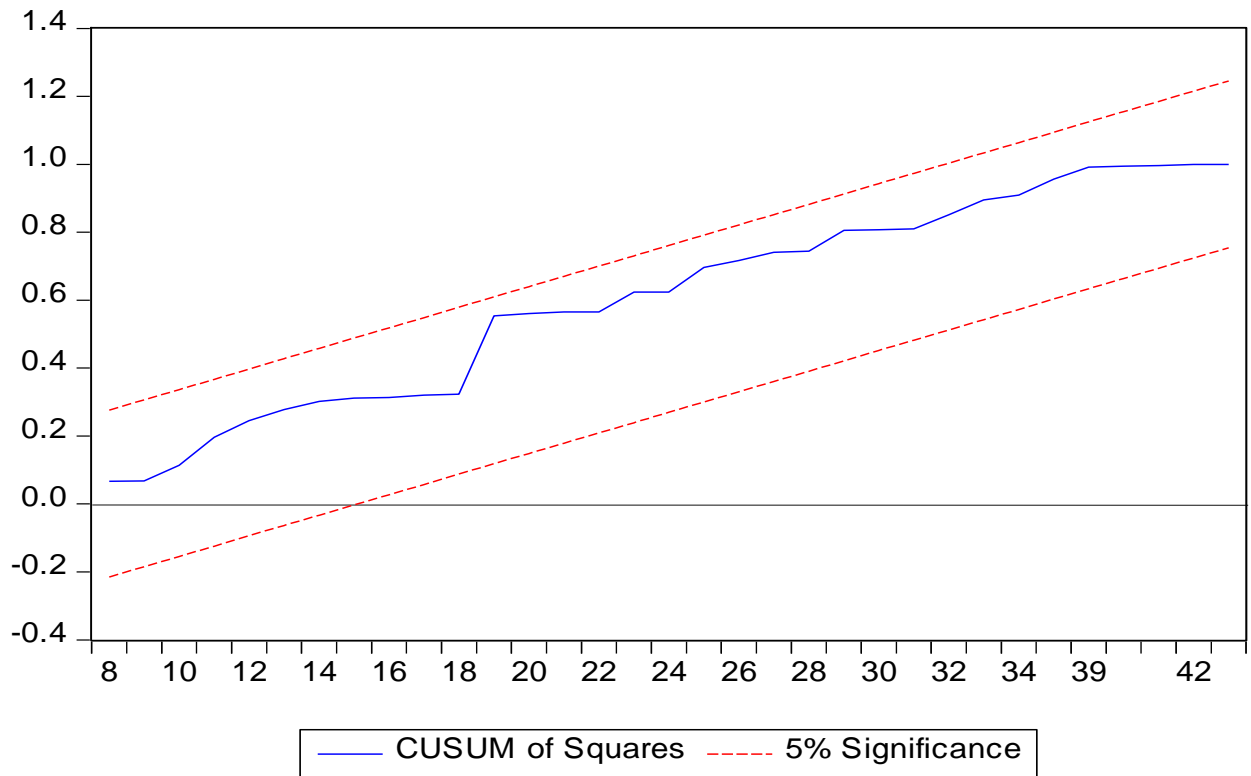
**Figure 4.11: Plot of Cumulative Sum of Recursive Residuals**



**Source: Author's Calculation Using Eviews**

Figure 4.11 shows that the plots of CUSUM statistics does not cross the critical bounds at 5 percent level of significance, indicating that coefficients of our inflation function are stable.

**Figure 4.12: Plot of Cumulative Sum of Squares of Recursive Residuals**



**Source: Author's Calculation Using Eviews**

In figure 4.12 the plots of CUSUM of squares lies within the critical lines. This shows that the specified overall model is statistically significant at 5 percent level of significance.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

The study is primarily meant to investigate the recent status of workers remittance inflows in Nepal and investigate whether the remittance inflow causes inflation in Nepal. For achieving the objectives annual data over the period of 1975-2017 has been used. The study makes use of Engle-Granger cointegration test to ascertain whether there is any long run relationships among variables used in the model, with Consumer Price Index of Nepal as dependent variable.

The chapter is the concluding chapter of the present study. Section 5.1 summarizes the findings from the study and draws some conclusions. Section 5.2 has some recommendation that can be made from the conclusions of the study.

#### **5.1 Summary of the Findings**

The main purpose of the study is to discuss the recent status of workers remittance inflows in Nepal and find out the relationship between remittance inflows and consumer price index in Nepal. The variables used in the model are selected following the relevant literature reviews. Annual time series data between 1975-2017 has been utilized in the study. The major findings of the study are:

1. Workers remittance inflows has become a major component of Nepalese economy in recent years. It is now equivalent to about one-third of the country's GDP.
2. Workers remittance in Nepal is a major sector of Nepalese economy. The remittance-GDP ratio was 29.6% in 2015/16.
3. The ratio of remittances to saving and investment is increasing with higher rate of growth of remittances in Nepal.

4. The share of remittance in total foreign exchange increased quite considerably over the years from less than 2 percent in 1991/92 to more than 60 percent in 2005/06.
5. Engle-Granger test with Consume Price Index (CPI) of Nepal in natural logarithm form as dependent variable was used for testing cointegrating relationship among variables. However, the test found no cointegrating relationships between the variables used in our study. Therefore, we cannot infer anything about their long-run relationship.
6. In short-run, workers remittance inflows does not affects price level in Nepal. The relationship is not significant below 10% level of significance.
7. The relationship between Broad Money Supply and Consumer Price Index of Nepal is found to be positive. However, the coefficient is not significant at 10% level of significance.
8. Consumer Price Index of India is significant and positive determinant of Inflation in Nepal, in short-run.
9. The study also find the relationship between Consumer Price Index and Real GDP in Nepal to be negative and significant.
10. The relationship between budget deficit and consumer price index in Nepal is found to be positive. However, the coefficient is not significant at 10% level of significance.
11. Diagnostic test for the model included Breusch-Godfrey test for autocorrelation, Breusch-Godfrey-Pagan test for Heteroscedasticity and Jerque-Bera test for Normality of error terms.
12. Breusch-Godfrey test confirmed the absence of autocorrelation in the model. Similarly, Breusch-Godfrey-Pagan established confirmed

homoscedasticity in the model. Jerque-Bera test also confirmed the presence of normality of error terms of the model.

13. For stability test of the model CUSUM and CUSUM Squares test was employed. Both tests confirmed the stability of the coefficients of inflation function.

## **5.2 Conclusions**

The study makes use of secondary data to examine the recent trend of remittance inflows in Nepal and ascertain the impact of remittance inflows in Nepal. Remittance inflows has become a major component of Nepalese economy in recent years sizing up to about one-third of national GDP. The share of remittance income in national saving and investment has also increased over the recent years due to the increase in the growth rate of remittance income. Similarly, remittance income has also become a major source of foreign exchange earnings for Nepal in recent years.

The study found positive but not statistically significant relationship between consumer price index and remittance inflows in Nepal. However, the coefficient of relationship between consumer price index of Nepal and India is found to be positive and significant. Also, the relationship between consumer price index and real GDP in Nepal is found to be negative and significant. The coefficients of relationship between broad money supply as well as revenue deficit with consumer price index of Nepal is found positive but not significant.



### **5.3 Recommendations**

From the conclusions of the study, the following recommendations can be made:

1. The study found the positive but not significant relationship between remittance inflows and Consumer Price Index of Nepal in short-run. This means remittance inflows in Nepal does not create inflationary pressure in the economy in short-run. The Government therefore should make appropriate policies and arrangements to encourage the inflows of remittance in short-run.
2. Although the short-run relationship between remittance inflows and price level in Nepal is found insignificant in the study, the long-run relationships might be positive and significant. The Government therefore should therefore take into consideration of possible long term effect of remittance inflows in price level of the economy.
3. Consumer Price Index of India is also a significant and positive determinant of inflation of which Nepal has no any control over. Therefore, inflation targeting by Nepal Rastra Bank through it monetary policy should take this factor into consideration.
4. The negative relationship between Consumer Price Index (CPI) and Real GDP in Nepal means growth should also be an important variable for taming inflation in Nepal.

## Bibliography

- Abdul-Mumuni, A., & Qaidoo, C. (2016). Effect of International Remittances on Inflation in Ghana Using the Bounds Testing Approach. *Business and Economic Research*, 6(1), 192-209.
- Acosta, P. A., Lartey, E. K., & Mandelman, F. S. (2009). Remittances and the Dutch disease. *Journal of International Economics*, 79(1), 102-116.
- Adhikari, D. R., & Guru-Gharana, K. K. (2014). An Econometric Study of the Effect of Remittances on Inflation in India. *Journal of International Business Research*, 13(1), 105-120.
- Central Bureau of Statistics. (2011). *National Population and Housing Census*. Kathmandu: Government of Nepal.
- Corden, W. M. (1960). The Geometric Representation of Policies to Attain Internal and External Balance. *Review of Economic Studies*, 28(1), 1-22.
- Dhungana, B. R. (2012). Remittance and Nepalese Economy. *Research Gate*.
- Dornbusch, R. (1974). Tariffs and Nontraded Goods. *Journal of International Economics*, 4(2), 177-85.
- Engle, R. F., & Granger, C. W. (1987). Co-Integration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, 55(2), 251-276.
- Engle, R., & Yoo, B. S. (1987). Forecasting and testing in co-integrated systems. *Journal of Econometrics*, 35(1), 143-159.
- Glystos, N., & Katseli, L. T. (1986). *Theoretical and Empirical Determinants of International Labour Mobility: A Greek-German Perspective*. Central For Economic Policy Research.
- Institute for Sustainable Development. (1994). Inflation. *Economic Review*.
- International Labour Organization. (2014). *Nepal Labour Market Update*.
- International Monetary Fund. (2009). *International Transactions in Remittances: Guide for Compilers and Users*. International Monetary Fund.

- Jahjah, S., Chami, R., & Fullenkamp, C. (2003, September 1). *IMF Working Paper*. Retrieved from International Monetary Fund.
- Khan, A. A., Ahmed, Q. M., & Hyder, K. (2007). Determinants of Recent Inflation in Pakistan. *MPRA*.
- Khan, S. Z., & Islam, S. (2013). The Effects of Remittances on Inflation: Evidence from Bangladesh. *Journal of Economics and Business Research*, 19(2).
- Khatiwada, Y. (1994). *Some Aspects of Monetary Policy in Nepal, New Delhi*. New Delhi: South Asia Publisher.
- Kim, S., & Yang, D. Y. (2008). *The Impact of Capital Inflows on Emerging East Asian Economies: Is too much money chasing too little good?* Asian Development Bank.
- Lopez, C. P., Lopez, C., & Cruz-Zuniga, M. (2008). Remittances, Inflation and Exchange Rate Regimes in Small Open Economies. *World Economy*.
- Maskay, N. M., Steinkamp, S., & Westermann, F. (2015). The Impact of Remittances on Central Bank Balance Sheets and Inflation in Nepal. *NRB Economic Review*, 27(2), 1-18.
- Muinhos, M. K. (2000). From capital inflow to inflation: the role of exchange rate and government debt. *Revista Brasileira de Economia*, 54(1).
- Narayan, P. K., Narayan, S., & Mishra, S. (2011). Do Remittances Induce Inflation? Fresh Evidence from Developing Countries? *Southern Economic Journal*, 77(4), 914-933.
- Nepal Rastra Bank. (2007). *Inflation in Nepal*. Nepal Rastra Bank.
- Ngoc, H. T., & Nguyen, M. (2014). Do workers' remittances induce inflation? the case of Vietnam, 1996-2012. *Review of Business and Economics Studies*, 2(1), 38-48.
- Nisar, A., & Tufail, S. (2013). An Analysis of Relationship between Remittances and Inflation in Pakistan. *Zagreb International Review of Economics & Business*, 16(2), 19-38.

- Oner, C. (2010, March). *What is Inflation?* Retrieved from International Monetary Fund.
- Pandey, R. P. (2005, July). Inflation. *50 Years of Nepal Rastra Bank*.
- Pant, B. (2011). Harnessing Remittances for Productive Use in Nepal. *NRB Economic Review*, 23(1), 1-20.
- Pfaff, B. (2008). *Analysis of Integrated and Cointegrated Time Series with R*. New York: Springer-Verlag.
- Poudyal, S. B. (2014). Determinants of Inflation in Nepal: *NRB Economic Review*, 26(2), 61-82.
- Roy, R., & Rahman, M. (2014). An empirical analysis of remittance –inflation relationship in Bangladesh:post-floating exchange rate scenario. *Munich Personal RePEc Archive*.
- Salter, W. E. (1959). Internal and External Balance: The Role of Price and Expenditure. *Economic Record*, 226-38.
- Swan, T. W. (1960). Economic Control in a Dependent Economy. *Economic Record*, 51-66.
- THAGUNNA, K. S. (2013). Empirical Analysis of Remittance Inflow: The Case of Nepal. *International Journal of Economics and Financial Issues* , 337-344.
- The Economic Times*. (2019). Retrieved from Cost Push Inflation.
- Upadhyay, M. P., & Upadhyay, K. (2011). Effects of Remittances on Inflation and Real Exchange Rate in South Asia. *Himalayan Journal of Development and Democracy*, 6(1), 88-96.
- World Bank Group. (2010). *Migration and Development Brief*.
- World Bank Group. (2017). *Migration and Development Brief 28*.