AN ANALYSIS OF RELATIONSHIP BETWEEN REMITTANCE AND INFLATION IN NEPAL: AN EMPIRICAL STUDY

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Abstract

Remittance is the importance sources of income generation in the Nepal. It play vital role of the Nepalese national income as well as precipitate income. The study has analysis the role of the remittance to increase the inflation of the country. The main objective of the paper is to analysis the relationship between remittances and inflation in Nepal. In this research only secondary data were used from the different sources. The infernal statistics were used the data analysis like regression and correlation. By the applying of the regression model in difference variable result are not same. After the model fit explanatory variables like remittance, broad money supply and government expenditure has significant. The regression results suggest that that the remittances are positively associated with inflation. Like same the correlation coefficient between remittance and inflation is 0.6419. This is statistically significant at 5% level and moderate positive correlation, which means there is a tendency for high inflation with high remittance inflow.

Keyword: remittance, inflation, money supply, broad money, regression, correlation

Introduction

Remittance is defined as the money sent by the worker outside the country from their home country. Remittances play a significant role in the economic development of the recipient country. The growth enhancing effects of remittances may materialize through various macro and microeconomic channels. Moreover, either remitted funds are oriented toward consumption or investment, they happen to have direct bearing for economic growth. At the micro-economic level remittances helps household combat poverty and improves the income distribution in favor of the poor (Nisar&Tufail 2013 Remittances provide self-insurance to the recipient households in times of uncertainties, economic crisis and natural disasters (Khan (2009)). Indeed, the spending allowed by remittances has a multiplied effect on local economies as funds subsequently spent create incomes for others and stimulate economic activity generally.

Now in Nepal, remittance has emerged as one of the main sources of foreign currency and in recent years, it has been an important source for family members remaining at home. Remittance pays an important role in the economy of Nepal and it has been cleared that remittance sent by foreign employees is one of the most effective tools for poverty alleviation (Paudel, 2014). Moreover, it would be highly beneficial to Nepal, where there is political conflict, people's war, natural calamities, low investment in entrepreneur activities and economic recession.

It is said that remittance has represented more than 10% of GDP of Nepal since late 1990s and this figure has been increasing year by year. Initially, the share of remittance to GNP was found 1.74 percent in mid-July 1991.This share increased sharply (9.38 percent) after the period of mid-July 1999 and eventually reached to 12.03 percent in mid-July 2005. On average, the share of remittance to GNP was 11.03 percent during the review period from mid-July 2000 to 2005. In fiscal year 2000/01, the banking section showed that Rs 15.9 billion was received as remittance and this amount

has been increased significantly over the years (Chaudhary, 2007). Similarly, the contribution of remittance to GDP of Nepal is also in increasing trend in recent years. The ratio of remittances to GDP in FY 2009/10 was 19.4%. Since then the share of remittance to GDP has increased continuously and reached to 31.4% in 2015. Under the transfer category of BOP, remittance income increased by 11.65 percent totaling Rs.65.42 billion in 2005 due to the increasing trend of Nepali workers going to Malaysia and Gulf countries for employment (Gaudel (2006)).

The overwhelming narrative of the remittances issue is a positive one, but it is important to recognize that such payments are the flipside of what is also the loss of labor abroad. Moreover, this labor is often the most highly skilled—the manifestation of the 'brain drain' that is a characteristic of the interaction between the rich and the poor worlds more broadly. Such labour migration causes skills shortages at home and imposes great human costs that come from people forced to be away from their families and their communities. The existence of substantial labor migration from a country, and the remittance flows created consequently, is often a most eloquent statement about the lack of economic opportunities at home.

A concern sometimes voiced about remittances is that they might promote a variant of the so-called 'Dutch disease'. A phenomenon identified with respect to the Netherlands in the 1960s, Dutch disease is the possibility that foreign exchange flows in one area (gas, in the case of the Netherlands) could result in the overvaluation of a country's exchange rate and, as a consequence, make other areas of its economy uncompetitive.

To increased money supply through the inflow of remittances stimulates the demand for goods and services and increases consumption expenditure on goods and services. The increase in demand puts upward pressure on prices and results in demand pull inflation (Nisar&Tufail (2013)). Inflation, on the other hand, has always been one of the major macroeconomic goals of stabilization policies due to its adverse consequences for the economy. Remittance recipient households tend to spend more on consumption and human development investment (Thapa & Acharya (2017)). The inflation rate in Nepal was recorded at 4.60 percent in July of 2018. (ES, 2019) Inflation Rate in Nepal averaged 8.24 percent from 1964 until 2018 (Xhaudhary & xiumin, 2018). During 1990s, inflationary pressure continued its double-digit level, mainly due to structural changes in the economy. Average inflation over the period 1991-1995 was 11.26 percent. Nepal witnessed the highest ever-recorded level of inflation, 21.1 percent, in 1992(NRB). The evidence shows that both remittance and inflation are increasing in Nepal since 2000.

Objectives

The main objectives of this study are to analysis the relationship ship between remittances and inflation in Nepal.

Research Methodology

A number of steps were followed to accomplish the present study.

Research Design

The main aims of this paper to analyses the relationship between remittance and inflation in Nepal. **Secondary** data were collected to obtain a continuous time series data set from the record of Government of Nepal, NRB, World Bank, ADB, IMF, NGOs, INGOs and Internet sources so as to cover a time span of 28 years since 1990s.

Models Specification

For the purpose of comparative analysis, the study has incorporated a series of model having a dependent variable, namely, overall inflation. The explanatory variables are remittances, broad money supply, real per capita income, and government expenditure and trade openness. The model

is presented as follows:

Model 1: $Z_{i=} \beta_0 \mu_i$

Where,

Z_i = Inflation

R_i = Remittances

BM_i = Money supply

PCI_i = Per capita income

GE_i = Government Expenditure

T_i = Trade openness

β_0= Intercept term

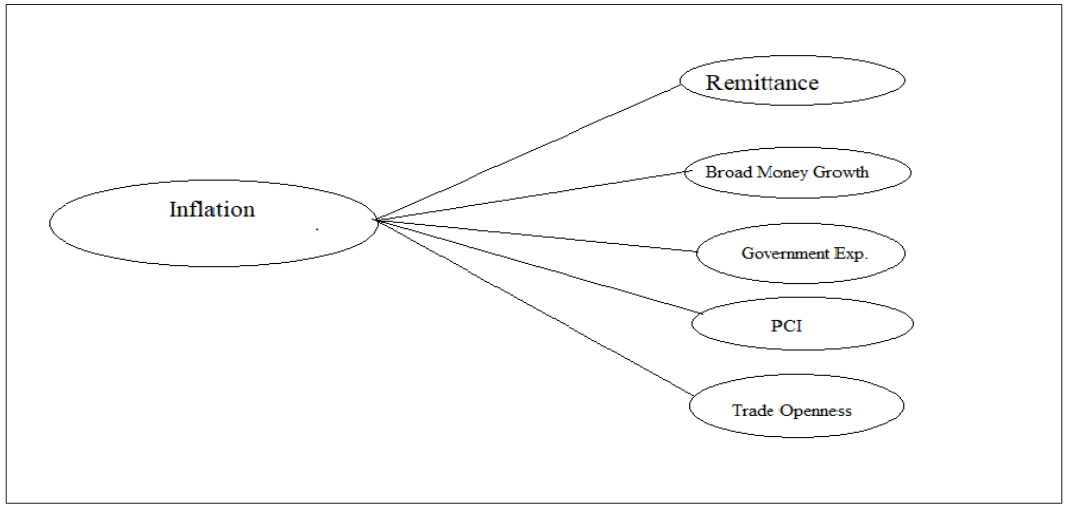
β_1,$\beta\beta_2$, β_3, β_4 and β_5 = linear parameters

μ_i= Error terms

I = 1, 2, 3, 4…..19

Conceptual Frame Work

A brief discussion on the expected relationship between the dependent and explanatory variables mentioned in the above models is presented as follows conceptual frame work:



Data Analysis and Interpretation

In this section, the trend of inflation is explained along with the causes of Inflation over the time period 1990-2018 in line graph. The causes of inflation are decomposed into five broad categories namely remittances (Rem), government expenditure (GE), broad money growth (BM), trade openness (T) and per capita income (PCI). They are shown in table with average and standard deviation as well as presented in line graph separately. The research used annual data from 1990 to 2018 of Nepal. The data is extracted from the website of NRB, World Development Indicators database of World Bank.

Data Description

The average, standard deviation, maximum value and minimum value of the dependent as well as

independent variables such as inflation, remittance, government expenditure, trade openness, broad money supply and per capita income (PCI) are computed from the following table.

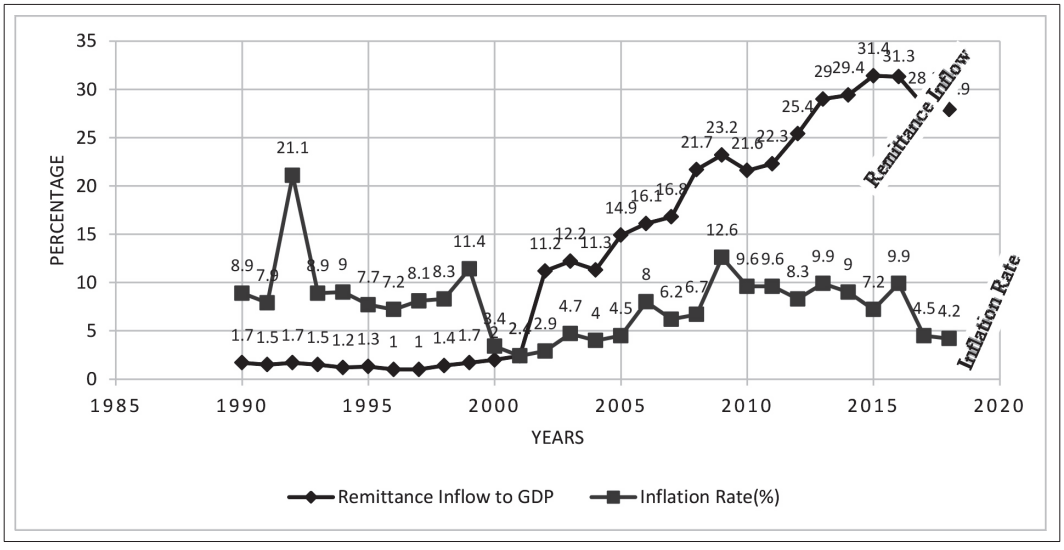
Table 1: Descriptive Statistics of the Variables

	Remittance Growth (% of GDP)	Government Expenditure (% of GDP)	Trade Openness (% of GDP)	Broad Money Growth (% of GDP)	PCI (US$)	Inflation (%)
Mean	13.53	9.45	48.68	18.09	525.31	7.8
Maximum	31.4	11.72	64.04	38.84	812	21.1
Minimum	1	7.8	32.19	2.66	354	2.4
Std. Dev.	11.38	1.09	6.97	7.08	131.88	3.57
Observations	29	29	29	29	29	29

(*Source*: Annex 1)

The average remittance inflow of Nepal from 1990 to 2018 is 13.53 percent. It was observed 31.4 percent as maximum and 1 percent as minimm. Similarly the average inflation rate of the 28 years is 7.8 percent. It was raised up to 21.1 percent from 2.4 percent.

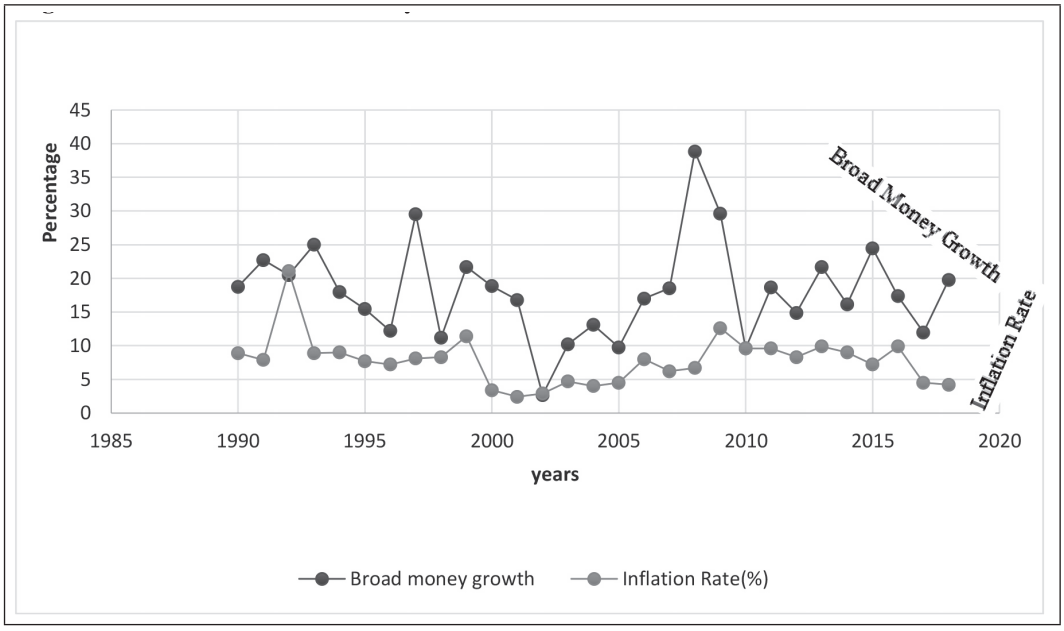
Figure 1:Trend of Remittance Inflow to GDP and Inflation.



(*Source*: Table 1)

During 1990s the contribution of remittance to GDP was below 2%. After 2000 the remittances as a percentage of GDP followed an increasing trend. In 2015-2016 it experienced peak value thereafter is showed a declining trend. During 1990s inflation rate followed an increasing trend, being highest in year 1992. The main factor behind high inflation rate was the structural change of government during 1990s. At the end of 1990s the inflation rate followed a declining trend. After the year 2000 it was in increasing trend. It experienced peak value in 2009 where the remittance also followed an increasing trend. During the first half of 2010s the inflation followed a declining trend however it had peak value in 2016 then after again it was in declining trend.

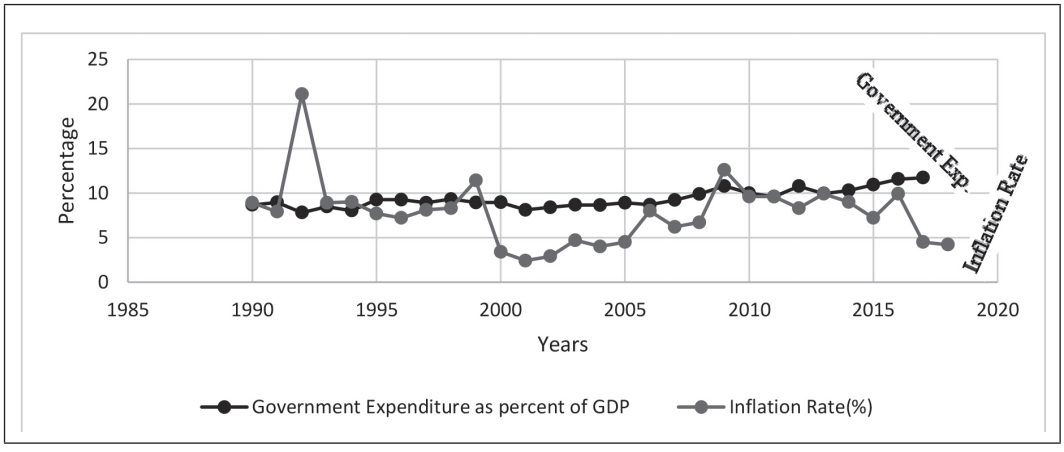
Figure 2: Trend of Broad Money Growth and Inflation



(*Source*: Table 1)

Broad money growth is a significant factor of inflation. It is clear from the figure.2 as broad money growth increases the inflation rate also increases and vice versa. During 1990s both the broad money growth and inflation followed the mixed trend. In the beginning both followed an increasing trend thereafter a declining trend. Same trend was observed in other decades too.

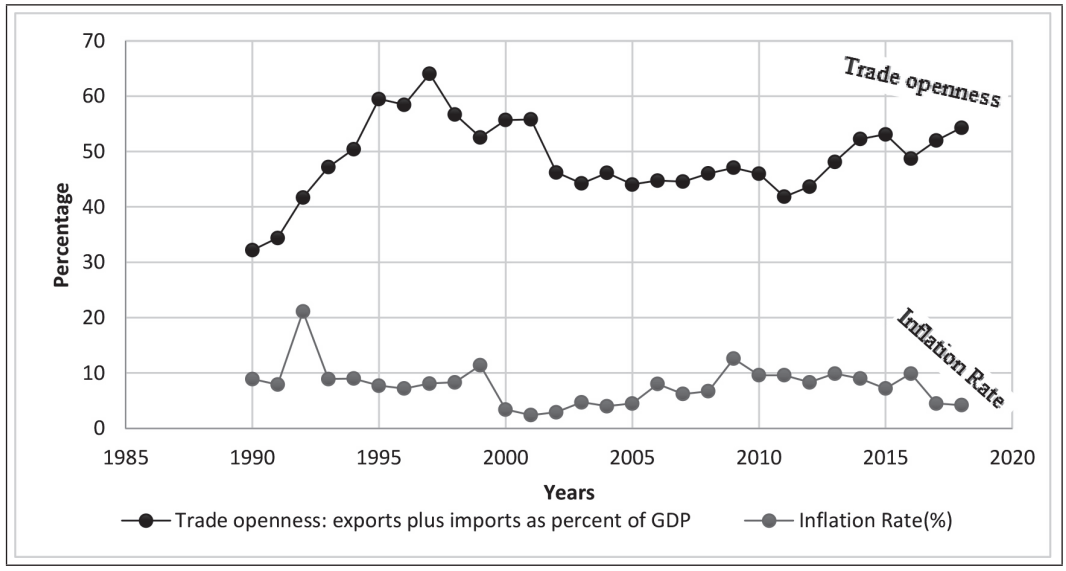
Figure 3: Trend of Government Expenditure as percentage of GDP an Inflation



(*Source*: Table 1)

Figure.3 showed that the trend of government expenditure as percentage of GDP was increasing throughout the time period and it was in between 7% to 12% but inflation followed the mixed increasing and declining trend

Figure 4: Trend of Trade openness and inflation rate



(*Source*: Table 1)

Figure.4 showed that trend of trade openness and inflation rate are inversely related. As trade openness followed an increasing trend the inflation rate followed a declining trend and vice versa.

Empirical Result

In fact, remittance inflows are considered as source of foreign currencies; therefore, they may replace the domestic currency in recipient countries in function of intermediate exchange or reserve. Therefore, higher amount of remittances may increase the total intermediate exchange in the recipient countries. The growth of remittance inflows may increase both domestic consumption and aggregate demand of the economy. The effect of remittances on aggregate demand will continue to expand with multiplier effect. Moreover, an increase in aggregate demand will raise the inflation rate, which is defined as the demand-pull inflation. In addition, remittance inflows increase supply of foreign currency, and then exert pressure on decrease of exchange rate. The decline in exchange rate will impact on trade balance negatively. Therefore, the central bank needs to increase domestic money supply to buy foreign currency for raising the exchange rate. According to the Quantity theory of money, the growth of domestic money supply leads to higher inflation. Therefore, it is expected from this study that remittance inflows raise inflation in the developing countries like Nepal.

In order to achieve the objective of the study, the time series data from 1990 to 2018 were used. While computing correlation coefficient and the regression of remittance and inflation through the time series data from 1990 to 2018, the result showed the negative correlation and negative coefficient of remittance in regression model due to outliers' data of 1990s. The inflation in 1990s was affected by the variables other than remittance. The contribution of remittance to GDP in 1990s was very less. So, the correlation coefficient and regression model for this study was enumerated through the time series data from 2000 to 2018. Other data were omitted for this section.

Correlation coefficient shows the degree and direction of the relationship between two variables and regression model determines the nature of relationship among the variables. The regression model for this study was set as follow.

$$\text{Log } Z_i = \log \beta_0 + \beta_1 \log R_i + \beta_2 \log BM_i + \beta_3 \log PCI_i + \beta_4 \log GE_i + \beta_5 \log T_i + \log \mu_i$$

Where,

Z_i = Inflation, R_i= Remittances, BM_i = Money supply, PCI_i= Per capita income,

GE_i= Government Expenditure, T_i = Trade openness,β_0= Intercept term

β_1,β β_2, β_3, β_4 and β_5 = linear parameters

μ_i = Error terms and i = 1, 2, 3, 4…..19

Correlation-matrix

The correlation between the variables was calculated by using Pearson's correlation formula. Pearson's correlation coefficient measures the strength and direction of the relationship between two variables. The obtained result is presented in the following table

Table 2:Correlationmatrix

	INF	REM	GE	T	BM	PCI
INF	1.0000	0.6419* P=0.00304	0.4522** P=0.051914	-0.3443 P=0.14927	0.3959** P=0.093366	0.363 P=0.126633
REM	0.6419*	1.0000	0.8592* P=0.00001	-0.038 P=0.8772	0.2887 P=0.3463	0.8907* P=0.00001
GE	0.4522**	0.8592*	1.0000	0.2466 P=0.3088	0.3114 P=0.1944	0.9166* P=0.00001
T	-0.3443	-0.038	0.2466	1.0000	0.1365 P=0.5773	0.3218 P=0.1791
BM	0.3959**	0.2887	0.3114	0.1365	1.0000	0.1865 P=0.4446
PCI	0.3634	0.8907*	0.9166*	0.3218	0.1865	1.0000

(*Source*: Annex1; Note: The asterisks * and ** denote statistically significant at α = 5% and 10% level respectively)

Table.2 shows the degree and direction of the relationship between two variables. The correlation coefficient between remittance and inflation is 0.6419. This is statistically significant at 5% level and moderate positive correlation, which means there is a tendency for high inflation with high remittance inflow. The correlation coefficients of inflation with government expenditure (GE) and broad money supply (BM) are 0.4522 and 0.3959 respectively. Although the relationship between them is weak, technically they have positive correlation and statistically significant at 10% level. Which means the inflation is affected by government expenditure and broad money supply. As the correlation coefficient of inflation and trade openness is -0.3443, the relationship between them is negative and weak. The result shows that the inflation rate and per capita income have positive but weak relationship since the value of correlation coefficient is 0.363.

The correlation coefficients between remittance and government expenditure (GE) and that of per capita income (PCI) are 0.8506 and 0.8907 respectively. There is a strong positive correlation of remittance with government expenditure (GE) and per capita income (PCI), which means that high

GE or PCI goes with high remittance inflow and vice versa. Remittance and broad money supply (BM) are positively related but the correlation is weak. Remittance and trade openness have weak negative relationship.

Regression Result

The results of counteraction are interpreted through Multiple Regression Model. It is designed to use with non-stationary times series that are counteracted of order one. It is used to capture the linear relationship among multiple time series. It adds error correction features to a multi-factor model. The error correction tells how much the error is being corrected each year in the variables.

Table 3: Coefficient Table Iteration I (adjusted R-squared = 0.581)

	Coefficient	SE	t-stat	Lower $T_{0.025(13)}$	Upper $T_{0.975(13)}$	Stand Coeff.	p-value	VIF
B	6.591751	4.027172	1.636819	-2.108424	15.291927	0.00000	0.125635	
Ln(Rem)	0.269886	0.269382	1.001870	-0.312078	0.851850	0.445168	0.334691	8.490516
Ln(T)	-1.836663	1.642776	-1.118024	-5.385664	1.712338	-0.343471	0.283792	4.058689
Ln(BM)	0.338854	0.143708	2.357938	0.0283922	0.649315	0.396081	0.0347085	1.213418
Ln(GE)	0.813869	1.628767	0.499684	-2.704869	4.332608	0.201117	0.625648	6.966531
Ln(PCI)	-0.190820	1.366045	-0.139688	-3.141980	2.760340	-0.0765077	0.891047	12.900312

(*Source*: Annex1)

Table 4: Coefficient Table Iteration II (adjusted R-squared = 0.611)

	Coefficient	**SE**	**t-stat**	**Lower $T_{0.025(14)}$**	**Upper $T_{0.975(14)}$**	**Stand Coeff.**	**p-value**	**VIF**
B	6.342953	3.483121	1.821054	-1.127599	13.813505	0.00000	0.0900338	
Ln(Rem)	0.243872	0.187703	1.299246	-0.158710	0.646454	0.402259	0.214849	4.432729
Ln(T)	-1.988379	1.188571	-1.672916	-4.537610	0.560851	-0.371843	0.116533	2.284612
Ln(BM)	0.339898	0.138396	2.455973	0.0430670	0.636729	0.397301	0.0277233	1.210135
Ln(GE)	0.678105	1.260413	0.538003	-2.025211	3.381422	0.167568	0.599024	4.485979

(*Source*: Annex1)

Table 5: Coefficient Table Iteration III (adjusted R-squared = 0.629)

	Coefficient	**SE**	**t-stat**	**Lower $T_{0.025(15)}$**	**Upper $T_{0.975(15)}$**	**Stand Coeff.**	**p-value**	**VIF**
B	5.893663	3.300464	1.785707	-1.141110	12.928436	0.00000	0.0943749	

Ln(Rem)	0.330129	0.0952650	3.465381	0.127077	0.533182	0.544539	0.00346086	1.198597
Ln(T)	-1.550620	0.845622	-1.833704	-3.353020	0.251780	-0.289979	0.0866148	1.213922
Ln(BM)	0.361304	0.129376	2.792660	0.0855450	0.637063	0.422322	0.0136605	1.110117

(*Source*: Annex1)

Table 6: Coefficient Table Iteration IV (adjusted R-squared = 0.574)

	Coefficient	**SE**	**t-stat**	**Lower $T_{0.025(16)}$**	**Upper $T_{0.975(16)}$**	**Stand Coeff.**	**p-value**	**VIF**
B	-0.115586	0.419879	-0.275285	-1.005689	0.774517	0.00000	0.786621	
Ln(Rem)	0.396056	0.0945091	4.190666	0.195706	0.596407	0.653283	0.000691869*	1.027882
Ln(BM)	0.296734	0.133367	2.224951	0.0140096	0.579459	0.346848	0.0408190*	1.027882

(*Source*: Annex.1; Note: The asterisks * denotes statistically significant at $\alpha = 5\%$ level)

From the coefficient table iteration IV, the coefficient of intercept term log(β_0)is -0.115586, coefficient of remittance (β_1) is 0.396056 and the coefficient of broad money supply (β_2) is 0.296734. Hence the regression model is;

Log **(INF)** = -0.115586 + 0.396056 Log **(Rem)** + 0.296734 Log **(BM).**

Conclusion

This study was an attempt to examine the role of remittances in causing inflation in Nepal. The determinants of inflation were estimated with particular focus on remittances using co-integration for the time period 1990-2018. The results indicate that the explanatory variables remittance, broad money supply and government expenditure significantly explain the changes in inflation. Moreover the impact of remittance in inflation was high. The regression results suggest that remittances are positively associated with inflation. Apart from remittances, broad money supply, government expenditure and real per capita income also affect inflation positively, while trade openness has a negative effect on inflation. The effect of remittance was the highest on inflation among the predicted variables. As the result of empirical analysis, 1% increment of remittance causes 0.35% increment in inflation. Similarly, 1% increment of broad money supply leads to 0.26% increment on inflation. Other variables like government expenditure and per capita income have positive impact on inflation but not statistically significant. Pearson's correlation shows that the impact of remittance on per capita income and government expenditure of Nepal was statistically significant. Higher the remittance inflow was higher per capita income and government expenditure and vice versa.

In fact, remittance inflow increases the income level of people in recipient countries. Therefore, higher amount of remittances increases the purchasing power of the people in the recipient countries. The growth of remittance inflows may increase both domestic consumption and aggregate demand of the economy. The effect of remittances on aggregate demand will continue to expand with multiplier effect. Moreover, an increase in aggregate demand will raise the inflation rate, which was defined as the demand-pull inflation. In addition, remittance inflows increase supply of foreign currency, and then exert pressure on decrease of exchange rate. The decline in exchange rate will impact on trade balance negatively. Therefore, the central bank needs to increase domestic money supply to buy foreign currency for raising the exchange rate. According to the Quantity theory of money, the growth of domestic money supply leads to higher inflation. Therefore, it was expected from this study that remittance inflows raise inflation in the developing countries like Nepal.

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APPENDICES

Table 4.1: Summary Statistics

Years	Remittance Inflow to GDP (%)	Trade openness: exports plus imports as percent (%) of GDP	Broad Money Growth (%)	Government Expenditure as percent (%) of GDP	Per Capita Income (USD)	Inflation Rate (%)
1990	1.7	32.19	18.74	8.66	354	8.9
1991	1.5	34.38	22.72	8.95	367	7.9
1992	1.7	41.7	20.5	7.8	372	21.1
1993	1.5	47.19	25.02	8.48	375	8.9

1994	1.2	50.43	17.98	8.02	396	9
1995	1.3	59.49	15.43	9.25	400	7.7
1996	1	58.46	12.2	9.25	411	7.2
1997	1	64.04	29.54	8.91	422	8.1
1998	1.4	56.71	11.18	9.31	426	8.3
1999	1.7	52.57	21.68	8.93	436	11.4
2000	2	55.71	18.85	8.95	455	3.4
2001	2.4	55.8	16.78	8.1	469	2.4
2002	11.2	46.23	2.66	8.4	462	2.9
2003	12.2	44.25	10.22	8.67	474	4.7
2004	11.3	46.15	13.09	8.64	490	4
2005	14.9	44.06	9.74	8.9	500	4.5
2006	16.1	44.76	16.99	8.68	510	8
2007	16.8	44.58	18.53	9.2	522	6.2
2008	21.7	46.04	38.84	9.89	548	6.7
2009	23.2	47.08	29.62	10.78	568	12.6
2010	21.6	45.98	9.59	9.99	592	9.6
2011	22.3	41.83	18.67	9.58	612	9.6
2012	25.4	43.66	14.86	10.76	642	8.3
2013	29	48.15	21.66	9.94	670	9.9
2014	29.4	52.26	16.14	10.28	711	9
2015	31.4	53.1	24.44	10.92	732	7.2
2016	31.3	48.75	17.36	11.56	730	9.9
2017	28.3	51.98	11.97	11.72	776	4.5
2018	27.9	54.32	19.76	11.69	812	4.2

(Sources: NRB, data.worldbank.org. theglobaleconomy.com/Nepal 1990 -2018)