Factors of the Inflation in Nepal

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Abstract

This study examines the impacts of macroeconomic variables on the inflation in Nepal during 1975-2022. The variables considered for the study is limited to the use of broad money supply, real GDP, Indian prices. The results suggest that all variables considered are significant in long run implying that these variables are the determinants of inflation in Nepal. The results are consistent with monetary theory. The money supply and Indian prices cause inflation in the long-run based on an Ordinary Least Squares regression model. The empirical results show that in the long-run, the major determinants of inflation in Nepal are Indian inflation (0.453), real income (0.347), and exchange rate (0.224). In addition, Indian inflation (0.286), the exchange rate (0.141), and government deficit (0.039) have significant effects in the short-run. Finally, the error correction term is found to be negative and statistically significant suggesting a correction of short-run disequilibrium within two years.

Keywords : *Inflation, Consumers Price Index, money supply M2,Real GDP, Nepal* Inflation, Indian inflation, Money supply (M2), government deficit, nominal exchange rate.

Introduction

The price level and its growth, inflation, is an important economic indicator. Inflation can be defined as the persistent rise in the general price level across the economy over time. Inflation is an increase in the volume of money and credit relative to available goods resulting in a substantial and continuing rise in the general price level (Webster's New Collegiate Dictionary, 1973ed.). More precisely, inflation is a substantial and continuing increase in the volume of money and credit relative to available goods, resulting in a substantial and continuing rise in the general price level. There is an important distinction between this definition and a popular misconception that results from our attempts to measure the general price level. There are various indices which measure the price level, such as; consumer price index (CPI): wholesale price index (WPI); sensitive price index (SPI); gross domestic product (GDP) deflator and so on. In Nepal, there are three main price indices, namely: the CPI; the WPI; and the Salary and Wage Rate Index (SWRI). The main focus for measuring the cost of living is placed on CPI. This is because CPI measures inflation impact which is the final measure of prices on households. Through this procedure, we tend to think of inflation as an increase in the price indexes so that any increase in an index is labelled "inflation"

A continuous rise in price level is termed as inflation (Parkin & Bade, 2001). Inflation is an ongoing process whereby prices are rising persistently year after year. Shapiro (2010) defines inflation as a rising price level. If such a rise in price level persist for long it is known as inflation. Consumer price index, gross domestic product deflator and other several indices measure the changes in price level. The use of these measures is purposely applied wherever appropriate. However, the rate of percentage change in consumer price index as a measure of inflation is widely used. We also here adopt this definition of inflation for our purpose.

Inflation is everywhere and is interestingly touchy issue in macroeconomics. All daily newspapers cover the news about inflation. There is no dearth of literature on inflation. 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.

Table 1 shows that price index (base year 2010) has increased persistently over the years. It has increased by little over twenty-five times (from 6.4 to 165.9) during 1975-2016. This means the purchasing power of the Nepalese rupee has decreased by the same speed. The impact of rising prices on the real sector is stylized fact. It constrains the rise of per capita real GDP and thereby reduces the standard of livings of the common people in the country. The stationary price level has thus been one of success parameters of the government. However, it has been a Herculean task to achieve in developing countries. In case of Nepal, however, there appear some positive signals in slowing down the speed of price rise in the later years. For instance, CPI took nine years to double from 6.4 in 1975 to 12.5 in 1984; it doubled even faster within six years between 1985 and 1991 and it took eight-year period between 1991 to 1999.

This has, however, turned upside down since the doubling period lengthened to 11 years between 1999 and 2010. This clearly indicates that prices have accelerated at slower motion especially after 1991's political change. One of the reasons for this might be relatively improved supply situation of the commodities during this period. Partly because Nepal's improved bilateral relation with India in the changing context and partly because of the sharply improved trade openness index due to trade liberalization policy adopted by the government during early 1990s (Bowdler & Nunziata, 2004).

Some empirical studies substantiate that trade openness index has important bearing on the combating hyperinflation. This paper attempts to examine the relation between inflation and other related variables that influence the inflation in the country and suggest policy implications.

Table 1. Consumer Price Index for the period 1975-2016

Year	CPI	Year	CPI	Year	CPI	Year	CPI
1975	6.4	1986	16.1	1997	44.0	2008	82.3
1976	6.2	1987	17.8	1998	49.0	2009	91.5
1977	6.8	1988	19.4	1999	52.6	2010	100.0
1978	7.3	1989	21.1	2000	53.9	2011	109.3
1979	7.6	1990	22.8	2001	55.4	2012	119.6
1980	8.7	1991	26.4	2002	57.1	2013	130.4
1981	9.7	1992	30.9	2003	60.3	2014	141.3
1982	10.8	1993	10.8	2004	62.0	2015	152.5
1983	12.1	1994	36.0	2005	66.3	2016	165.9
1984	12.5	1995	38.8	2006	70.9	2017	
1985	13.5	1996	42.3	2007	74.9		

Source: World Bank, World Development Indicators, Base Year 2010=100.

Figure 1 presents the relationship between inflation and the growth of money supply in Nepal during 1975-2016. Both the inflation and the growth of money supply move in the same direction but broad supply has always been higher than inflation. High positive correlation between money supply and consumer price index exhibits a very close association between these two variables.
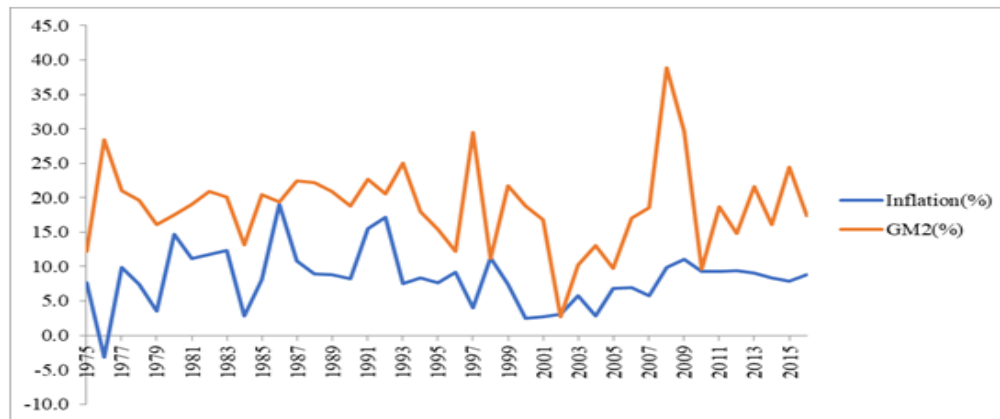

Figure 1. Relationship between Inflation and Money Supply, 1975-2016

Figure 2 shows that inflation and real GDP have opposite trends (i.e. when inflation increases the real GDP decreases). Inflation is higher for almost all years and that of real

output seems to be lower for almost all years. However, the high correlation   coefficient between   prices   and   real   GDP demonstrates strong association between two variables.
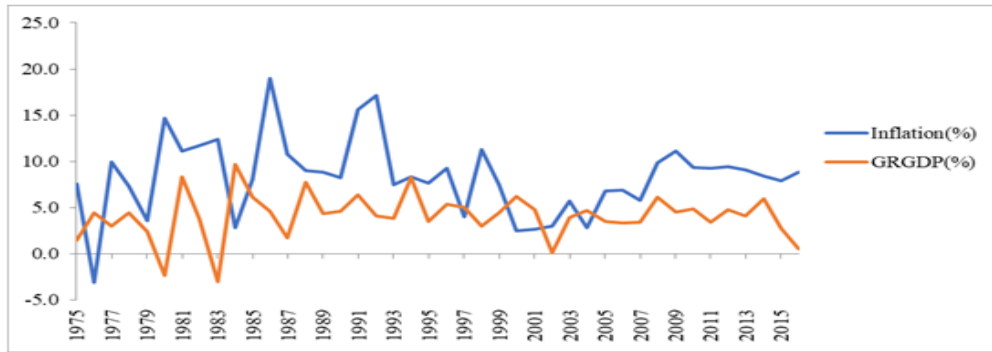

Figure 2.   Inflation and Growth Rate of Real GDP, 1975-2016

Figure 3 presents the inflation rates in Indian and Nepalese economies. This clearly shows that inflation, with an exception for a few years, is always higher in Nepal compared to India. Since there is the higher dominance of imported Indian goods in the domestic market, inflation in Nepal is dependent on inflation in India.
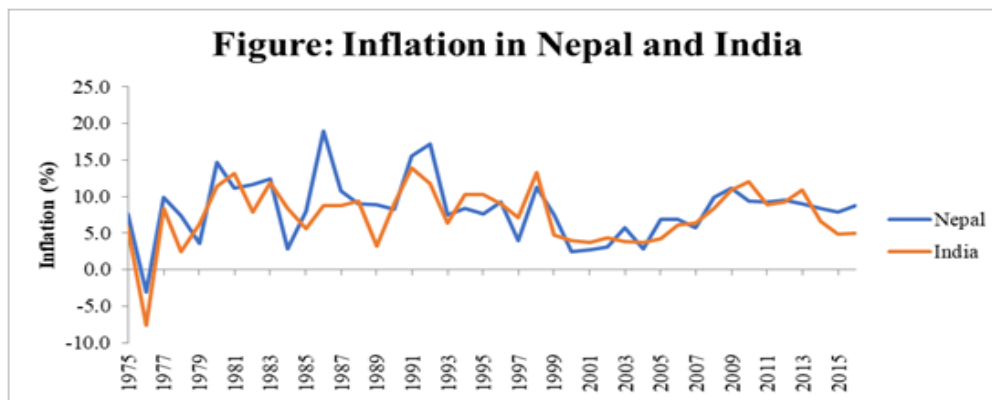

Figure 3.   Inflation in Nepal and India during 1975-2016

There are several factors that may influence the inflation. In Nepal, price level, budget deficits, money supply, real GDP are continuously rising for many years. However, this does not prove that one causes other. We examine in this paper effects of a number of variables including on prices dividing the paper into five sections: The paper is structured as follows. Section 1 is introduction; Section 2 provides the literature review. Section 3 explains methodology and data; Section 4 presents and discusses the empirical results. The final section includes the conclusion.

Literature Review

Several studies explain the relationship between inflation and other macroeconomic Variables. Some empirical studies such as Pahlavani & Rahimi (2009) find that even the international inflation and expected inflation have influential bearings on domestic inflation. Others such as Khan et. al. (2007) constructed econometric model to study inflation incorporating fiscal and monetary policies of the government in Pakistan. In reality, evident from empirical studies suggests that several factors including money supply play roles in macro-economy. Vuyyuri & Sethaiah (2004) finds that budget deficits cause inflation in India. In a study for Pakistan's inflation, Khan (2007) finds that the most important determinants of inflation in 2005-06 were adaptive expectations, private sector credit and rising import prices whereas, the fiscal policy's contribution to inflation was minimal. Bayo (2011) on the study for Nigeria reveals that fiscal deficits, money supply, interest and exchange rates are cause of inflation in Nigeria during the period under review. Pahlavani & Rahimi (2009) states that inflation in Iran is largely determined by money supply, exchange rate, GDP, expected inflation rate and imported inflation along with dummy variable. Kumar (2013) finds that money supply and imports index is the most important variables in explaining inflation in India while Laryea & Ussif (2001) states that inflation in Tanzania is largely influenced by monetary factors both in the short run or the long run.

A study for NRB notes that Indian prices have a significant bearing on variation of domestic prices in the country (NRB, 1994:100). Besides, they find that an increase in money stock causes price rise and the gradual depreciation of the exchange rate of domestic currency has been partly responsible for the price rise in Nepal. A study by Neupane (1992) finds that one-year lagged money supply, cost of holding real balances, budget deficits, low output growth rates and import prices are the important determinants of price inflation in Nepal. NRB (2001) reveals that there is no structural shift in money price relationship in Nepal. This study finds that broad money has stronger relationship with inflation compared to narrow money. Mathema (1998) finds that a rise in wages in industrial sector causes national inflation while Koirala (2008) discloses a significant relationship between inflation and inflation expectations in Nepal. Koirala (2013) again finds non-constant time varying parameters of both the constant and autoregressive of order one AR (1) coefficient of inflation over the long run. He opines that the changes in the expectations of rational economic agents on macroeconomic policies due to the lack of policy commitment, credibility and dynamic consistency might have contributed for this. Paudyal (2013) finds that variables such as budget deficits, Indian prices, broad money supply, exchange rate and real GDP influence inflation in Nepal.

Nguyen (2015) investigates effects of fiscal deficit and broad money M2 supply of in Asian countries: Bangladesh, Cambodia, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam in the period of 1985-2012 and finds out broad money M2 and fiscal deficit are significant determinants of inflation. Tran (2018) analyse the effectiveness of monetary policy transmission channels in restraining inflation in case of Vietnam for 2001-2015 and suggests that inflation rate increases with the policy rate.

Empirical studies in several other countries have shown that a set of explanatory variables such as real gross domestic product (RGDP), budget deficits (BD) or government expenditure, exchange rate (EXC), imported price (MP), broad money (M2) and expected inflation (P^e) explain the variation in price level (P). We examine these variables to explain the inflation in Nepal. In our case, CPI series is a measure of price level and among the independent variables real GDP, the liquidity or money supply (M2) and the imported price is consumer price index of India (CPII) since Nepal's imports from India accounts 65.7 percent for 2016, which includes goods of daily consumption such as vegetables, clothes, medicines, transport equipment's and petroleum products (TEPC, 2016).

NRB (2017) has explored the optimal level of inflation for Nepal based on the data of the period from 1978- 2016. This study used real GDP per capita growth is a dependent variable and inflation, inflation squared. Saving to GDP, life expectancy at birth, trade openness, exchange rate overvaluation and lagged real GDP per capita are the explanatory variables. The results suggest that there exists a threshold effect of inflation.

Chaudhary and Xiumin (2018) examined analysis of the determinants of inflation in Nepal using time series data from 1975-2016 by applying ordinary least square multiple regression model. The variables considered for the study is limited to the use of broad money supply, real GDP, Indian prices. The study suggested that all variables considered are significant in long run implying that these variables are the determinants of inflation in Nepal. The results are consistent with monetary theory. The money supply and Indian prices cause inflation in the long-run based on an Ordinary Least Squares regression model.

Byanjanakr (2020) examined the determinants of inflation in Nepal using time series data from 1975-2018 by applying the ARDL approach to cointegration the price level is dependent variable and Indian inflation, money supply (M2), government deficit, nominal exchange rate and crude oil price are independent variables. The study found that Indian inflation is the most significant factor influencing the Nepalese inflation. Similarly, the exchange and government deficit have positive impact on prices in both the long-run and short-run. The Study suggested that government deficit causes an increase in money supply, which exerts pressure on price. The study made recommendation to establish mechanism for monitoring price development in Indian market.

Several other indices including consumer's price index, gross domestic product (GDP) deflator measure the changes in price level. Moreover, whichever measure is appropriate is applied purposely. However, since the consumers price index is widely used in the measurement of inflation. This study too consider CPI as measuring of the price index in Nepal are food and beverage 43.91 percentage, housing, water, electricity, gas and fuels 20.30 percentage, furnishings and house equipment 4.3 percentage, healthcare 3.5 percentage communication 2.8 percentage, miscellaneous good and services 2.8 percentage and recreation and culture 2.5 percentage (NRB2022). Besides CPI, GDP at constant price, investment, board money supply, volume of remittance inflow, interest rate and consumers price index of India are also consider as the variables under analysis

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Research Gap

The main objectives of the study is asses major determinants of inflation rate in Nepal examining the relationship with GDP ant constant price, investment, board money supply, volume of remittance inflow, interest rate and inflation rate in India.This study has attempted to carry out distinctly from other previous studies in terms of sample size and methodology. The study covers the data of 47years. Thus, it believes that this study is different from earlier studies of Nepalese context. The importance of this study may be viewed from its contribution to fill the gap between the previous studies and also finding of this study can add value to the existing body of the literature

Methodology and Data

Methodology

The quantity theory implies that inflation is a monetary phenomenon in the very long-run. That is the sustained inflation is a function of monetary growth. However, a number of complementary factors that may contribute to sustained inflationary pressures in the long run. In addition, external shocks, such as higher prices in trading partners could increase inflationary pressures in the long-run.

In order to investigate the determinant of inflation in Nepal, this paper uses ordinary least square multiple regression model. We consider price level in Nepal as dependent on money supply (M2), Real GDP of Nepal and Consumer Price Index of India as independent variables. We use log form of all variables for the regression purpose. The model equation is:

$$l\eta P_t = \beta_0 + \beta_1 l\eta RM2_t + \beta_1 l\eta RGDP_t + \beta_1 l\eta CPII_t + \varepsilon_t \quad \dots\dots\dots\dots(1)$$

Here P_t denotes the price level of Nepal at period t; $M2_t$ is Money Supply at period t; $RGDP_t$ is the Real GDP at time t; and $CPII_t$ is the imported price is consumer price index of India at period t; ε_t represent all omitted variables from the model and also the random errors from the process of estimation. It is expected that the money supply has positive impact on inflation; hence β_1 is expected to be positive. Real GDP and inflation have negative relationship; therefore β_2 is expected to be negative. Imports from India accounts for more than 60 percent of total imports of Nepal and is expected to impact inflation in Nepal positively. Thus, β_3 is expected to be positive. The assumption of the error term is in accordance to Ordinary Least Square (OLS) assumption to be distributed in zero mean and constant variance.

Data

Our study covers the period 1975-2016. The data for CPI, Money Supply, Real GDP of Nepal and CPI of India is taken from the World Bank: development indicator. The data for money supply and real GDP are in the national currency of Nepal.

Empirical Results

This study deals with multiple OLS regression model to observe the impact of macroeconomics variables which affects the inflation in Nepal during the period 1975-2016.

Table 2.   Results of Regression

No. of obs = 42		F(3,38) = 9542.05		
Prob>F = 0.0000		R^2 = 0.9979		
		SER = 0.0471		
Independent Variables	Coefficient	Robust Std. Error	t-statistic	Prob.
Intercept	11.806**	4.268	2.77	0.009
lM2	0.197*	0.080	2.45	0.019
lRGDP	-0.778**	0.259	-3.00	0.005
lCPII	1.074**	0.121	8.87	0.000

Note: Coefficients with *, and ** are statistically significant at the 5%, and 1% level, respectively.

Table 2 displays the results of multiple OLS regression analysis. The results show that the coefficients of money supply, real GDP and imported price (Consumer price index of India) have the expected signs. All the coefficients of the independent variables are statistically significant. The coefficient of imported price (CPII) is larger than that of other two independent variables; this indicates that imported price has more impact on inflation in Nepal. The empirical result suggests that inflation in Nepal is mainly determined by inflation in India with broad money supply having an effect in the long-run. Money supply has significant impact on inflation however it has less impact compare to other variables. The results show that the inflation and real GDP are negatively related.

Conclusions

The main aim of this paper was to establish the relationship between inflation, money supply, real GDP and imported price (CPII) by reviewing relevant studies using Nepal as the reference country. It is clear that the growth of money supply, the growth rate of real GDP and import price are the main determinants of inflation in Nepal. This study suggests that prices in Nepal are highly dependent on Indian prices because of a weaker supply of domestic production supplemented by the increased imported goods from India. Inflation control is not an easy task for country like Nepal which shares open border with big country and is heavily dependent on the imported goods for the daily consumption and materials for other development purposes. In this context, dominant factor for inflation is supply shock generated outside the country. Thus, inflation control becomes more challenging and complicated for the monetary authorities since the monetary and fiscal policies framed to control the inflation seem to have lesser implications. However, it does not imply that there is no room for such policy implications at all. This empirical study suggests that, given the open border with India and liberalized trade regime, there exists higher prospect of Indian domination on the domestic prices in Nepal.

Based on the above results, the study makes the following recommendations: (i) to establish mechanism for monitoring price developments in India to ensure harmonization of domestic prices; (ii) to study the implication of capital mobility between India and Nepal; (iii) to adjust the monetary policy formulation based on the above results.

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