Determinants of Inflation in Nepal

Resham Bahadur Thapa Parajuli

Abstract: *The price level and its growth, inflation, is an important economic indicator. 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. As the purchasing power of the monetary unit becomes less predictable, people resort to other means to carry out their business, means which use up resources and are inefficient. The current inflation in Nepal is running in double digit figure and is considered alarming. To address this problem is very important for a country like ours where the country is still struggling for the economic stability and growth. Using secondary data, this study tries to analyze the determinants of the inflation in Nepal considering CPI as inflation measuring rod.*

I. INTRODUCTION

Inflation means a persistent rise in the price levels of commodities and services, leading to a fall in the currency's purchasing power. Earlier, the problem of inflation used to be confined to national boundaries, and was caused by domestic money supply and price rises. In this era of globalization, however, the effect of economic inflation crosses borders and percolates to both developing and developed nations. Central bankers believe that mild inflation, in the 1 to 2 per cent range, is the most benign for a country's economy. High inflation, stagflation and deflation are all considered to be serious economic threats (Economy Watch, 2009).

The price level and its growth, inflation, is an important economic indicator. There are various indices which measure the price level, such as: consumer price index (CPI), wholesale price index (WPI), sensitive price index (SPI), gross domestic product (GDP) 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 (Nepal Rastra Bank, 2007).

Printing too much money, increase in production costs and tax rise, decrease in the availability of limited resources such as food or oil, war or other events causing instability

Mr. Parajuli is Faculty Member at Central Department of Economics, Tribhuvan University.

etc., generally, are the factors causing economic inflation. Price inflation is a major modern economic phenomenon. It creates uncertainty in that people do not know what the money they earn today will buy tomorrow. Uncertainty, in turn, discourages productive activity, saving and investing. Inflation reduces the competitiveness of the country in international trade. If this is not offset by a devaluation of the national currency against other currencies, it makes the country's exports less attractive, and makes imports into the country more attractive, which in turn tends to create unbalance in trade. Inflation is a hidden tax on "nominal balances". That is, people who hold bonds and bank accounts lose the value of those accounts when the price level rises, just as if their money had been taxed away. As the purchasing power of the monetary unit becomes less predictable, people resort to other means to carry out their business, means which use up resources and are inefficient.

High inflation complicates long-term economic planning, creating incentives for households and firms to shorten their horizons and to spend resources in managing inflation risk rather than focusing on the most productive activities (Bernanke, 2006, as cited in NRB, 2007). Private entrepreneurs react to high levels of inflation by lowering their investment, which eventually leads to a retardation of the country's economic growth. When prices are stable, both economic growth and stability are likely to be achieved, and long-term interest rates are likely to be moderate (Batini and Yates 2003, Pianalto 2005, as cited in NRB, 2007). For a developing country the production process and the issues of growth and stability are very crucial denominators. For an issue to be addressed and solved, the underlying causes should be understood and thus resolved. This study, therefore, focuses on identifying the factors behind the inflation, which will help them to address well and resolve the problem of inflation by using appropriate measures. Inflation has been standing as a national economic problem, as is currently running in double digit figure and is considered alarming. To address this problem, it is very essential to effectively address the problem in a country like ours, which is still struggling for the economic stability and growth. Using secondary data, this study attempts to analyze the determinants of inflation in Nepal based on CPI as inflation measuring rod.

II. LITERATURE REVIEW

Inflation is the general increase of prices across the economy which is otherwise known as the "cost of living". The definition of inflation is "a general increase in prices and fall in the purchasing value of money", effectively meaning that your money won't buy you as much today as it did yesterday (Cole, 2008).

Demand-pull inflation refers to the idea that the economy actually demands more goods and services than available. This shortage of supply enables sellers to raise prices until equilibrium is put in place between supply and demand. The cost-push theory, also known as "supply shock inflation", suggests that shortages or shocks to the available supply of a certain good or product will cause a ripple effect through the economy by raising prices through the supply chain from the producer to the consumer. It can readily

be seen in oil markets. When OPEC reduces oil supply, prices are artificially driven up and result in higher prices at the pump. Money supply plays a large role in inflationary pressure as well. Monetarist economists believe that if the Federal Reserve does not control the money supply adequately, it may actually grow at a rate faster than that of the potential output in the economy, or real GDP. The belief is that this will drive up prices and hence, inflation. Low interest rates correspond with high levels of money supply and allow for more investment in big business and new ideas which eventually leads to unsustainable levels of inflation as cheap money is available. The credit crisis of 2007 is a very good example of this at work. Inflation can artificially be created through a circular increase in wage earners demands and then the subsequent increase in producer costs which will drive up the prices of their goods and services. This will then translate back into higher prices for the wage earners or consumers. As demands go higher from each side, inflation will continue to rise (Vakil, 2008).

Inflation is not a welcome guest to any economy. Generally, inflation makes an appearance when extensive excess demand and supply constraints exist in the market for many individual goods. Further persistent money creation is one of the prime causes of inflation and the other is supply shortage. Price rise also occurs on account of supply shocks, such as an oil shock or crop failure, as well as increases in indirect tax. However, continuous inflation occurs when there is a continuous excess money supply growth in the economy. The most influential parameter of inflation in Nepal is the Indian wholesale prices on which Nepal has no control. And the only available parameter that possesses a contractility effect on inflation is the agricultural income. Unfortunately, there has not been any worthwhile policy announcement regarding the agricultural sector as of recently. Though the five-year Plan documents placed top-priority on agriculture and irrigation with high budgetary allocation each year, the performance of the agricultural sector has remained dismal. It indicates that something is critically amiss in the government's policymaking mechanism and it requires radical change (Hamal, 2007).

The study conducted by the Research Department of NRB on "Inflation in Nepal" suggests that a single model of inflation does not embrace the present scenario of the inflation in Nepal comprehensively. However, the study indicated that short term (less than one year) inflation in Nepal is found to be affected by both narrow money and Indian inflation. In the long-term, however, the price level in Nepal is mainly determined by Indian price level. Nepalese inflation has been affected more by the structural and external factors. However, increase in aggregate demand through the expansion of monetary aggregates as a factor affecting inflation cannot be disregarded. Overall supply of goods and services such as agricultural products and industrial products, and supply constraints due to closures and strikes come under structural factors. Factors such as price hike of petroleum products in the global market and direct impact of Indian inflation come under external factors that affect inflation in Nepal. The world currently is facing challenges to contain inflation due to food and petroleum products' price hike. India has also adopted anti-inflationary measures including smoothening the internal supply of goods and services. This has affected the overall supply in the Nepalese market, too.

In this way, the steps that India took to ease supply situation internally, the effect of increasing Indian inflation, and the increasing prices of petroleum and food products in the international market have exerted pressure on price situation in Nepal. In this regard, there is a need to ensure economic stability by attaining price stability through effective monetary management, supply management and fiscal management so that people's livelihood will not get adversely affected (NRB, 2007).

NRB's report Inflation in Nepal states that there have been limited empirical studies on inflationary issues in Nepal. As mentioned in the report the earliest ones have been by Fry (1974), Pant (1977) and Pant (1978). These studies have shown a weak association between money and prices using basic statistical analysis. (Pant, 1977, as cited in NRB, 2007) showed that inflation in Nepal is not much explained by the movement of monetary aggregates, rather the author concludes that it is mainly due to structural changes in the economy. These conclusions contrast with the observation of (Sharma, 1987, as cited in NRB, 2007) who identifies the influencing factor of India and was also shown empirically by (Khatiwada, 1981, as cited in NRB, 2007). The author had adjusted the above mentioned closed economy model to take into account external influence and found a relatively strong relationship of both narrow money and Indian prices, with Nepalese prices (NRB, 2007).

NRB has completed a study on factors affecting price inflation in Nepal in FY 2006/07. According to the NRB Act, 2001 and its Strategic Plan (2005/06-2009/10), NRB has a role to play in price stabilization that in order to fulfill this objective, this study was done with a view to develop a short- and long-term price projection tool.

Empirical studied(cited in NRB, 2007) mentioned that Narrow Money supply(NRB, 2006; Pandey,2005; Mathema,1998; Khatiwada,1994 and ISD,1994), Broad Money Supply(NRB,2006), Real GDP (NRB, 2006; Pandey,2005; Mathema,1998; Khatiwada,1994 and ISD,1994), Government Expenditure (Pandey,2005; Khatiwada,1994 and ISD,1994), Indian price level (NRB, 2006; Pandey,2005; Khatiwada,1994 and ISD,1994), Expectation Factor(Mathema,1998 and ISD,1994), Nominal Exchange Rate(Khatiwada,1994), Wages and Imported Prices (Mathema, 1998) , Exchange Rate with India (Pandey, 2005) and Interest Rate on Fixed Deposit (NRB,2006) are the determinants of CPI in Nepal. All most all the studies mentioned above adopted OLS method to establish the relationship among the variables using secondary data.

III. DATA AND VARIABLES

The data used here are based on the secondary sources. The source of the data used for the regression is NRB's report Inflation in Nepal (2007). Besides, Research & D Report on Inflation (2009) of Nepal Investment Bank (NIB), different websites, and newspaper are also used for the review of literature as well as analysis of data. As per the availability of the data, this study uses the data from 1977/78 to 2005/06 for the regression analysis.

The variables used in the econometric analysis in this study are CPI, money supply, velocity, GDP, interest rates, wage rate and external factors namely Indian inflation.

For this study, CPI is taken as the variable for the assessment of inflation which

is dependent up on different determinants. A CPI is a measure estimating the average price of consumer goods and services purchased by households. A consumer price index measures a price change for a constant market basket of goods and services from one period to the next within the same area (city, region, or nation).

The independent variables here are taken as money supply, real GDP, interest rate, wage rate and Indian inflation. In economics, money supply is the total amount of money available in an economy at a particular point in time. The GDP is a basic measure of a country's economic performance, is the market value of all final goods and services made within the borders of a nation in a year. An interest rate is the price a borrower pays for the use of money they do not own, for instance a small company might borrow from a bank to kick start their business, and the return a lender receives for deferring the use of funds, by lending it to the borrower. Interest rates are normally expressed as a percentage rate over the period of one year. A wage is compensation, usually financial, received by a worker in exchange for their labor. Indian CPI is the measure of Indian inflation which affects the Nepalese CPI due to the sharing of open border.

IV. MODELS, METHOD AND TEST

The model used in the study comprises CPI as the major dependent variable and the influencing factors here are taken as money supply, wage rate, interest rate, real GDP and Indian inflation.

Dependent Variable	Independent Variable	Expected Outcome
Nepalese CPI	Money Supply	positively related
	Wage Rate	positively related
	Interest Rate	negatively related
	Real GDP	positively related
	Indian Inflation	positively related

The factors influencing inflation in the general open-economy monetary model are given as:

P = f (m, y, r, ext) .... (1)

Where p, m, y, r and ext are price, money, GDP, interest rates and external factors respectively. For Nepal, (Mathema, 1998, as cited in NRB, 2009) has also found that a cost-push factor, namely workers' wages, is also important for influencing inflation in the country. Thus, the above mentioned model incorporates structural factor of wage rate and the hybrid form of model including both monetary as well as cost push factors, can be expressed as:

P = f (m, y, r, w, ext)....................................... (2)

Though the relationships among all independent variables are mentioned above, due to the econometric OLS problems, separate models are used for different variables respectively.

Since the data used here follows the time series, Dickey-Fuller unit root test was performed on the data to check for the presence of unit root. The data thus have been refined and are co-integrated. Similarly, due to other econometric problems, different models have been used separately for different variables.

Thus the refined models used by the study are:

$dlnCPI = \beta_0 + \beta_1\ dlnM_1 + e_i$ .... (3)

$dlnCPI = \beta_0 + \beta_1\ dlnM_2 + e_i$ .... (4)

$dlnCPI = \beta_0 + \beta_1\ dln\ WAGE + e_i$ .... (5)

$dlnCPI = \beta_0 + \beta_1\ dlnRT + e_i$ .... (6)

$dlnCPI = \beta_0 + \beta_1\ dlnRGDP + e_i$ .... (7)

$dlnCPI = \beta_0 + \beta_1\ dlnICPI + e_i$ .... (8)

The data collected from the secondary data sources are analyzed through different statistical methods namely the Time Series Analysis and Simple Regression. Before regressing the time series date co-integration test was performed based on augmented Dickey Fuller unit root test using STATA software. Due to the OLS problems, separate models have been used for different variables. To check the presence of autocorrelation in the data, Durbin Watson test has been performed and to correct the autocorrelation, Prais Winsteins correction has been performed. in the STATA software. For the significance of the study, the t-value has been checked and for the goodness of fit, the R^2 value has been assessed.

Findings: determinants of Inflation in Nepal

On an average if there is no change in the growth rate of M1 the rate of change in NCPI will still be positive. Other things remaining the same, percentage change in growth rate of M1 brings 1.012 percentage negative changes in the NCPI.

dlnNCPI	= 75.66 -1.012 dlnM1 .... (3)
t-value	(-272.53) (1.78)
p-value	(0.087) (0.0)
S.E	(42.56) (0.003) R^2 = 0.99 DW = 0.81

It can be said that when the M1 is low, the amount of money in the vault is also low, which tends to decrease the AD and eventually brings the level of inflation down. R2 here implies that 99 per cent of variation in dlnNCPI is due to the variation in dlnM1. There is no autocorrelation in this model.

dlnNCPI	= 37.39 + 0.503 dlnM2 .... (4)
t-value	(1.78) (548.32)
p-value	(0.086) (0.00)
S.E	(20.98) (0.009) R^2 = 0.99 DW = 0.83

On an average, if there is no change in the growth rate of M2, the growth rate of NCPI will still be positive. Other things remaining the same, percentage change in growth rate of M2 brings 0.503 percentage positive changes in the NCPI. While the relationship

of NCPI with M1 is negative, the relation with M2 is positive which implies that as the amount of time deposit increases, people become more confident in their spending, which eventually increases the inflation. R2 here implies that 99 per cent of variation in dlnNCPI is due to variation in dlnM2. There is no autocorrelation in this model.

dlnNCPI   = 46.87 -0.125 dlnRGDP ……………………. (5)

t-value   (1.78)   (-438.01)

p-value   (0.086)   (0.000)

S.E   (26.32)   (0.0002) R^2 = 0.99   DW = 0.83

On an average if there is no change in the growth rate of RGDP the growth rate of NCPI will still be positive. Other things remaining the same, percentage change in growth rate of RGDP brings 0.125 percentage negative changes in the NCPI. In the short run, the effect of RGDP may be positive. However, the data set here is of 30 years so it can be said that this is the effect in the long run. Thus, fiscal policy side can be said to have less effect on the Nepalese inflation. R2 here implies that 99 per cent of variation in dlnNCPI is due to variation in dlnM2. There is no autocorrelation in this model.

dlnNCPI   = 46.147 + 0.77 dlnRT ……………………. (6)

t-value   (1.78)   (-444.90)

p-value   (0.086)   (0.000)

S.E   (25.91)   (0.0001) R^2 = 0.99   DW = 0.83

On an average if there is no change in the growth rate of RT the growth rate of NCPI will still be positive. Other things remaining the same, percentage change in growth rate of RT brings 0.77 percentage positive changes in the NCPI. About the rate of interest, it can be said that when the rate of interest is high, the depositor gets higher benefit and thus increase the spending confidently, which increases the inflation. R2 here implies that 99 per cent of variation in dlnNCPI is due to variation in dlnM2. There is no autocorrelation in this model.

dlnNCPI   = 46.42 -0.47 WAGE ……………………. (7)

t-value   (1.78)   (-442.25)

p-value   (0.086)   (0.000)

S.E   (26.06)   (0.0001) R^2 = 0.99   DW = 0.83

On an average if there is no change in the growth rate of WAGE the growth rate of NCPI will still be positive. Other things remaining the same, percentage change in growth rate of WAGE brings 0.47 percentage negative changes in the NCPI. This does not support the theory in the short run. However in the long run, wage rate appears to have no positive effect on the rise of inflation. R2 here implies that 99 per cent of variation in dlnNCPI is due to variation in dlnM2. There is no autocorrelation in this model.

dlnNCPI   = 46.31 + 0.029 ICPI ……………………. (8)

t-value   (1.78)   (443.26)

p-value   (0.086)   (0.000)

S.E   (26.007)   (0.00006)   R2 = 0.99 DW = 0.83

On an average if there is no change in the growth rate of ICPI the growth rate of NCPI will still be positive. Other things remaining the same, percentage change in growth rate of ICPI brings 0.47 percentage positive changes in the NCPI. The influence of Indian inflation in Nepal is basically due to the open border and the trade dependence, due to which the increase of price in India has somewhat direct effect on the Nepalese inflation. R2 here implies that 99 per cent of variation in dlnNCPI is due to variation in dlnM2. There is no autocorrelation in this model.

V. CONCLUSION

Nepal has been facing ups and downs in the economic sector over the years. The rise and fall in the price situation is no different. The measurement of the prices in Nepal started from 1973 and Nepal has witnessed inflation rate as low as 3.72 per cent to as high as 21.07 per cent. Over the years, there have been many determining factors for the change in inflation rate. The major determining factors can be said as the agricultural production rate, the supply of the goods and services, the devaluation of Nepalese money to US dollar, the weaknesses of the monetary policy, price hike in fuels and most importantly the regression equation shows that the Nepalese inflation is highly influenced by the money supply (M2) and also by the Indian inflation over which Nepal has no control. Thus, the only control factor here can be the effectiveness of the monetary policy. As of now the policy should be more contractionary so as to control the flow of money supply, as money supply appears to be one of the most determining factors behind the high rate of inflation in Nepal. The fiscal policy side has no positive influence on the rate on increment of inflation in Nepal so the monetary policy should be strong. Likewise, the Indian inflation also plays a role on the rate of inflation in Nepal mainly because of the open border the price hike in India directly affects the price situation in Nepal. In case of money supply, M2 appears to have more influence on the inflation rate rather than M1 implying that as time deposit increases the confidence in people to spend more increases which eventually increases the price of goods and services in the market. As of now the monetary policy should be M2 targeted. Similarly it can be concluded that in the long run, the high rate of interest also affects the inflation. Thus, the rate of interest too should be under control. On the other hand, the food vs. fuel situation too has highly affected the price situation in the global scenario and in this era of globalization that factor too has been affecting the inflation rate in Nepal.

VI. RECOMMENDATIONS

- The issue of inflation cannot be addressed and/or controlled by taking a single measure. However with a wise coordination of monetary and fiscal measures, the continuous process of rising prices can be aided widely.
- The inflation here appears to be highly affected by M2 rather than M1 so the monetary policy should be M2 targeted. Since inflation is affected by the time deposits, to relieve the situation, the country must bring about a contraction in

deposits through various measures.

- The fiscal policy side has negligible effect on the inflation so the factors like RGDP, WAGE are not related for the rise of inflation. Their growth need not be given much attention.

- Another major contributor for the high inflation in Nepal is Indian inflation which affects the inflation more or less directly due to the open border and the trade dependence. These sectors should be addressed well by concentrating on export rather than import and other various measures.

- The monetary policy for the current fiscal year had made projection of annual average inflation at 7.5 per cent. However, the inflation hit 14.4 per cent (y-o-y) in the sixth-month of the current fiscal year thereby making the six-month average inflation at 14.0 per cent. And, even though NRB has been working for the control of inflation through different measures, the issue of implementation has affected the process at large. This is mainly attributed to supply-driven factors such as energy crisis, bandhs, strikes, etc. which have raised the costs of production and distribution. These factors can be controlled by the efforts from the side of the people.

REFERENCES

Anonymous. (July, 2009). Inflation: What it really means. Retrieved August 1st 2009, from http://www.nairaland.com/nigeria/topic-300395.0.html

Christie, S. (2009). Economy Hits Restaurant Hard. retrieved 10th July, 2009 from http://www.freshcut.com/pages/arts.php?ns=1293

Cole, N. (2008). Guide to Inflation. Retrieved November 29th 2008, from http://ezinearticles.com/?Guide-to-Inflation&id=1419010

Hamal, S. (2007). Neglected Issues of Inflation. Retrieved December 2nd, 2008   from http://nepalnews.com_mercantilecommunications

Nepal Investment Bank Ltd. (2009). Inflation Report. R&D department, Kathmandu: Nepal.

Nepal Rastra Bank (2007). Inflation in Nepal.

.... (2009a). Recent Macroeconomic Situation.

.....................(2009b).Macro-economic situation: Double-digit inflation continues.

Reagle, D. Salvatore (2002). Theory and Problems of Statistics and Econometrics, 2nd Ed. McGraw Hill.

The Economic Watch (2009). Inflation. www.economywatch.com, retrieved 8th July, 2009.

The Kathmandu Post (2009, July 3). Inflation in Nepal. Kathmandu Post.pp.8 Kathmandu: Nepal.

Vakil, K. (2008). Inflation - Causes and Effects. Retrieved August 25, 2008, from http://ezinearticles.com/?Inflation---Causes-and-Effects & id=967309