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Monetary Policy and Economic Growth of Nepal

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Abstract:

This study aims to investigate the relationship between key monetary variables in Nepal and GDP growth between 1999 and 2022. All the calculation are made on the base of the data from the website of Nepal Rastra Bank and Ministry of Finance, Nepal. The results have confirmed that the broad money supply and Interest Rate is positively and significantly affect Gross Domestic Product growth in the Nepalese economy. This was done using the Johansen approach to cointegration and the error correction model. Additionally, the Error Correction coefficient term (-0.70) supports the development of a link between monetary-related variables and GDP growth at a 70% rate of adjustments toward the equilibrium.

Introduction

Monetary policy is the policy formulated by the central bank of the country to achieve the macroeconomic objectives by macroeconomic variables through monetary instrument and change in money supply. Mainly there are two types of monetary policy; expansionary and contractionary monetary policy.

Expansionary monetary policy refers to a set of measures taken by a central bank to stimulate economic growth and increase aggregate demand within an economy. The primary goal of expansionary monetary policy is to promote investment, consumption, and borrowing by making money more accessible and cheaper to borrow. The ultimate aim of expansionary monetary policy is to stimulate economic growth, combat recessionary pressures, and increase inflation when it is deemed too low. However, it's important to note that the effectiveness of expansionary monetary policy can vary depending on various factors, including the state of the economy, prevailing interest rates, and the response of businesses and consumers to changes in monetary conditions.

Contractionary monetary policy refers to a set of measures implemented by a central bank to slow down economic growth and reduce inflationary pressures within an economy. The main objective of contractionary monetary policy is to curb excessive spending and borrowing by making money less accessible and more expensive. The goal of contractionary monetary policy is to slow down an overheating economy, reduce inflation, and address the risks of excessive borrowing and spending. However, it's important to consider that the effectiveness of contractionary monetary policy can be influenced by various factors, including the state of

the economy, the level of interest rates, and the response of businesses and consumers to changes in monetary conditions.

The quantitative measures of monetary instrument are; CRR, Bank rate and Open market operation.

Economic growth is an increase in the production of goods and services in an economy. It can be also measured as an increase of people's real income. Economic growth and monetary policy have a close relationship between them (Nouri and Samimi,2011).

The term Growth can be known as the process of transformation. Either we study of modern period or of ancient period we can see that growth was unequal and unbalanced. Economic growth can be defined as the increase or improvement in the inflation – adjusted market value of the goods and services produced by an economy over a certain period of time. The term Economic growth was given by Nobel Prize winner Paul Roomer, from the concise encyclopedia of economics, economic growth occurs whenever people take resources and re-arrange them in such a way that they are more valuable.

Economic growth is affected by technological change, population growth, and human capital accumulation. Odhiambo (2018) economic growth as prerequisite to reducing poverty and improving standard of living and priority based to its effectiveness and increasing role of economic growth. Economic growth rate of Nepal is expected to reach 2.50 percent by the end of 2022 according to trading economics global macro models and analysts' expectations. Government and central bank try to achieve economic growth by implementing monetary policy and fiscal policy.

Monetary policy is a set of tools used by a nation's central bank to control the overall money supply and promote economic growth and employ strategies such as revising interest rates and changing bank reserves requirements. Different researcher analyzed how monetary policy causes economic instability in country. In the 1966, Nepal Rastra Bank realized the role of monetary policy to influence the availability of money in order to guide the economy at determined direction. The primary objectives of monetary policy is to maintain price stability while keeping in mind the objective of growth. When a central bank is trying to achieve price stability means they are combating inflation and deflation, which each have differing negative effects on the economy.

An economy can reach price stability when the supply of money in an economy equals the demand for it. Price stability in an economy means that the general price level in an economy does not change much over time. There is no significant degree of inflation or deflation. Empirical researchers have found that monetary policy has disparate long –run and short – run effects. The short- run effects are predominantly real, while the long – run effects of changes in the quality of money are mainly nominal.

Central bank can attempt to control inflation or deflation by engaging in open- market operations. If the central wants to slow down the rate of increasing prices, then it will decrease the supply of money in the economy by selling government securities. If there is less money in the economy, interest rates will tend to increase as borrowers have to compete for loanable funds. Some borrowers will decide not to borrow money if interest rates hit a certain level, which results in a decrease in demand. As demand decreases, sellers will produce less and they attempt to induce customers to buy their products. Eventually the supply of money will equal the demand for it and prices will stabilize. If the central bank wants to decrease price, then it will buy government securities. This will increase the money supply and tend to reduce interest rates as lenders compete for borrowers. Demand will increase which will induce sellers to increase production and increase their prices to gain more profit from the demand. Eventually, the demand for money will equal the supply of it, and the general price level will stabilize.

The above discussion reveals that there is no any consistency in impacts of monetary policy on the economic growth of country i.e., IR, CRR, M2 are found to be inconsistent relying to various territory across the countries. The different methodology applied previously tend to obtained different result and significance.

1. How monetary policy affects the economic growth of the country?
2. What is the relationship between GDP, CRR, IR, and broad money supply?

Objective of the study:

The main purpose of this study is to examine the relationship between monetary policy and economic growth in the context of Nepal. This paper helps us to examine the factor that is influencing the gross Domestic Product of Nepal. Specifically, it Analyze the relationship of Cash Reserve Ratio, Interest Rate and broad Money Supply with the Gross Domestic Product in Nepal.

1. To examine the relationship between Monetary Policy and Economic growth.

Literature Review:

According to Ahamed, Afzal and Ghani (2016), Monetary policy plays an important role on the Economic growth of the country. Monetary policy plays an active role in stabilizing economy and increasing the economic growth of the country. A stable exchange rate policy has ensured to enhance the growth of the country through

adopting effective monetary policy measures to control over inflation and increase the economic growth. Interest rate is also a prominent variable in monetary sector as it provides a favorable condition to attract international as well as domestic investment to invest in the country, which significantly increases the economic growth of the country.

Kamaan (2014) founded the interest rate channel followed by the credit channel to be the most effective channel in influencing economic growth. This study also concluded that interest rate channel is the most operational channel of monetary policy transmission on inflation in Kenya.

Onyeiwu (2012) investigated Liquidity Ratio, Broad money supply, GDP, inflation Rate and balance of payment. The study found that Monetary policy presented by Money supply exerts a positive impact on GDP growth and Balance of payment but negative impacts on Rate of Inflation.

Odhiambo (2018) Founded that majority supports the relevancy of monetary policy on supporting economic growth, mainly in financially developed country with fairly Independent central banks. The relationships tend to be weaker in developing economies with structural weakness and underdeveloped financial market that are weakly integrated into global markets.

Precious and Palesa (2014) revealed that the money supply, Repo Rate and Exchange rate are insignificant monetary policy instrument that drive the economic growth in south Africa while inflation is significant. This study therefore recommends that monetary policies should be used to create a favorable investment climate that attracts both foreign as well as domestic investment which encourages the economic growth and sustainability.

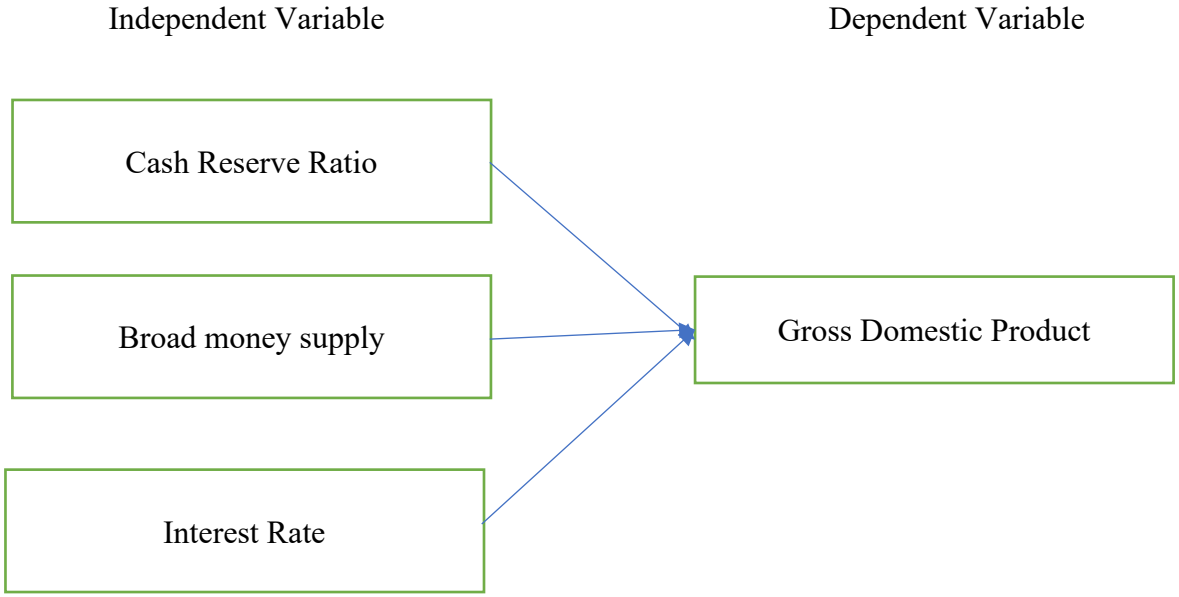
Mishra and Pradhan (2008) stated that financial innovation can make monetary analysis more complex, and modify the monetary policy transmission mechanism which makes monetary policy effective only in short - period.

Younsi and Nafla (2017) examined the relationship between financial stability, Monetary policy and Economic growth in 40 developed and developing countries. They stated that trade openness, capital account openness, and foreign direct investment have positive impacts on economic growth with high degree in developed countries. The main finding confirms the complementarily and the importance of real, financial, monetary variables and bank solidity as well as their significant impacts on financial stability and economic growth.

Twinoburyo and Odhiambo (2017) found that money supply has a positive significant impact on economic growth both in short run and long run. However, interest rate were found to have a positive impacts on economic growth only in short run. Overall monetary policy matters for economic growth.

According to Nouri and Samimi (2011), Evolution of money supply and gross domestic product are in a close relationship and has a positive and significant relationship between money supply and economic growth. Mehar (2022)

Conceptual Framework:



Cash Reserve Ratio:

Cash reserve Ratio is defined as the amount of money bank and financial institution keep as a reserve in central bank of the country. Cash reserve ratio is also a determinant of willingness of lending of commercial bank. (Modigliani, 1963) supports this view and said willingness of banks to lend affects monetary policy transmission. (Gertler and Gilchrist,1991) stated that small businesses experience declines in loan facilities during tight monetary policy and they are affected more adversely by the changes in banking. Based on it, this study develops the following hypothesis:

H1: There is positive relationship of cash reserve ratio with the economic growth of the country.

Broad Money supply:

Nature of money supply in the market determines the economic growth of the country. Monetary policy presented by Money supply exerts a positive impact on GDP growth (Onyeiwu, 2012). According to Nouri and Samimi (2011), Evolution of money supply and gross domestic product are in a close relationship. Moreover, Twinoburyo and Odhiambo (2017) found that money supply has a positive significant impact on economic growth both in short run and long run. Based on it, this study develops the following hypothesis:

H2: There is a positive relationship of money supply with the economic growth of the country.

Interest Rate:

Here in this study Bank Rate is taken as the interest rate. Generally, Bank Rate is defined as the rate of Interest taken by central bank to BFIs. According to Nouri and Samimi (2011), Interest rate were found to have a positive impact on economic growth in short run. Kamaan (2014) founded the interest rate channel followed by the credit channel to be the most effective channel in influencing economic growth. Based on it, this study develops the following hypothesis:

H3: There is a positive relationship of Interest rate with the economic growth of the country

Methodology:

The study is based on the secondary data which was gathered from 1999 to 2022 from the website of central bank of Nepal(www.nrb.org.np) and Ministry of Finance (www.mof.gov.np) The data collected are viewed on GDP, CRR, Broad money supply(M2), Interest Rate.

Model:

The model estimated in this study assumes that the Economic growth (GDP) depends on the different variables like Cash Reserve Ratio (CRR), Broad Money Supply(M2), Interest Rate (IR).

The model takes the following format:

$GDP_t = \alpha_0 + \beta_1 CRR_t + \beta_2 M2_t + \beta_3 IR_t + \mu_t$

Where,

GDP = Gross Domestic Products

CRR = Cash Reserve Ratio

M2 = Broad Money Supply

IR = Interest Rate

Descriptive Analysis:

Descriptive statistics were employed in this study to characterize the properties of the investigation's variables. Descriptive statistics reveal the nature of the data and establish whether or not it is suitable to continue with further investigation. The table of descriptive statistics displays the data's mean, median, dispersion, and normality in Table 1.

Table 1:

Descriptive statistics of variables for the period 1999 to 2022

	Mean	Maximum	Minimum	Std. Dev	Jarque-Bera	Probability	Sum
LnGDP	11.11	11.68	10.53	0.38	2.125	0.345	266.67
LnM2	10.93	11.74	10.18	0.50	1.893	0.388	262.48
CRR	5.145	6	3	0.98	5.807	0.054	123.5
IR	3.42	8.44	0.22	1.93	3.761	0.152	82.14

Source: Calculation are based on the data from website of NRB and MOF

Table 1 shows several observations, measures of central tendency, the measure of dispersion (standard deviation), minimum and maximum values, and Jarque-Bera statistics.

Similarly, Table 1 shows descriptive statistics for all the variables Log GDP, Log M2, CRR and IR all have positive mean and median values. The result indicates that the average broad money supply is 10.9369 percent with a minimum value of 10.1841 percent and a maximum of 11.7407 percent. The standard deviation of the broad money supply is 0.5048 percent, which shows the variability of the broad money supply in Nepal.Similarly, mean values of Log GDP, CRR and IR are 11.1113, 5.1458, and 3.4225 percent with standard deviations of 0.380935, 0.9833, and 1.9389 percent respectively. Finally, Table I also presents the value of Jarque-Bera, which shows the nature of the distribution of variables included in the study. The P value of every variable is greater than 0.05 which states that all the data are normally distributed.

Unit Root Test:

The stationary status of the variables is examined using the unit root test. Non-stationary variables are those that have a unit root. There are several tests available to test unit root, however some tests have been modified to account for autocorrelated residuals, hence in this study, the Augmented Dickey- Fuller test is used instead. When the mean, variance, and auto-covariance are all constant for each lag, the condition is said to be stationary. The consequences of spurious regression can also be eliminated with the use of the unit root test. Higher R-square values are produced by spurious regression, even when the variables are unrelated. When simple regression is used and a significant result is produced despite the variables not being stationary, this is a mistake of conventional regression analysis.

Augmented Dicky-Fuller test was performed to check the stationary of the variables. The test elucidates that all the variables are non-stationary at level. Hence it is made stationary in the first difference. The test indicates that GDP, M2, IR and CRR are stationary in the first difference. The result of Unit root test is presented in Table2

Unit root test helps to find the situation of stationary of the data so ADF test is run to confirm unit root in the model. The test can help in avoiding spurious regression effect and find co- integration between variables. Result shows that the null hypothesis is rejected and alternative hypothesis is accepted in 1% and 5% level of significance indicating variables are stationary.

Table 2:

Unit Root Test

Variables	At level		At first Difference	
	t-statistics	p-value	t-statistics	p-value
LNGDP	-0.106432	0.9376	-3.195024	0.0341**
LNM2	-0.866296	0.7803	-3.557274	0.0159**
IR	-2.847379	0.0674	-5.292529	0.0003***
CRR	-2.579155	0.1115	-4.855042	0.0009***

Source: Calculation are based on the data from website of NRB and MOF

*Note: ***, **, * indicate significant at 1%,5% and 10%*

Table 2 result indicates that all variables (Log GDP, Log M2, CRR, and IR) are stationary at first difference. The variables are integrated at the same order 1(1), therefore it is appropriate to use Johansen co-integration approach to test whether the series is a long-run association or not for 1999 – 2022.

Johansen Co-integration Test:

Johansen co-integration test was used to find the co-integration that establishes the long run relationship between dependent and independent variables. It was applied after unit root test confirming all variables were integrated in order I (1). Augmented Dickey- Fuller test result shows the variables were non- stationary at level and found stationary in first difference so Johansen co-integration test is run.

The outcome of the Johansson approach to cointegration test is shown in Table 3. The null hypothesis of no cointegration is tested against the alternative hypothesis at least one cointegration arises in the model. The Table 3 shows that the test statistical value is greater than critical value in both case at a 5% level of significance implying the rejection of null hypothesis and acceptance of at least one cointegration equation exist in the model and it confirms the long-term relationship between the monetary policy and GDP growth. The long-run association of the variables in the study is shown in Table 3.

Table 3:

Johansen Integration test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Prob**
None*	0.691756	50.62327	47.85613	0.0268
At most 1	0.452219	24.73231	29.79707	0.1712
At most 2	0.304975	11.49095	15.49471	0.1830
At most 3	0.146584	3.487182	3.841465	0.0618

Source: Calculation are based on the data from website of NRB and MOF

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

*Denotes rejection of the hypothesis at the 0.05 level

The existence of co-integration in the model is shown by trace statistical value at appropriate significance level. The existence of one cointegrating vector is shown by trace statistical value as well as its corresponding probability value which is less than 5%.Thus,trace tests reject the null hypothesis of no long-run association between the variables includes in the study. Thus, the key monetary factor and GDP are long-run associations.

Table 4:
Error Correction Model

Regressor	Coefficient	T statistics	Probability
Ect (-1)	-0.7047	-3.7848	0.0014
Constant	-0.0178	-1.4474	0.1650
IR	0.0064	2.9695	0.0082
CRR	0.0025	0.3946	0.6977
LnM2	0.4605	2.6887	0.0150

Source: Calculation are based on the data from website of NRB and MOF

Adjusted R^2: 0.5103

F Statistics: 4.6907

Durbin Watson Test: 1.8474

The statistically significant and negative ECT (-1), which indicates that in the current year, more than 70% of last year's disequilibrium is corrected, indicates the presence of cointegration among the variables. As a result, the disequilibrium level of growth rate is corrected at the speed of 70% speed of within a year. Or, to put it another way, the divergence from long-run equilibrium is changed to the point where around 70% of the disequilibrium is fixed in a year.

When the expected short-term dynamics reached the 5% level, it was clear that there was a short-run causal link between monetary and economic variables and GDP growth. Table 4 demonstrates a favorable and statistically significant correlation between Nepal's GDP growth and the country's overall money supply. A 1% increase in the broad money supply corresponds to a 0.46% increase in Nepal's GDP, according to the broad money supply coefficient at lag one, which is 0.46. The expansion of the broad money supply (M2) has a positive effect on Nepal's GDP growth as a result. A similar positive and statistically significant correlation between the Interest

rate and GDP growth is seen by the coefficient of Interest rate (0.0064). The results show that a 1% rise in the bank rate results in a 0.0064% Increase in GDP in Nepal. The expansion of the broad money supply (M2) has a positive effect on Nepal's GDP growth as a result. The entire model is a strong match, as shown by the F statistics of 4.6907.

Diagnostics Test:

Table 5:

Breusch- Godfrey serial correlation LM Test

Null hypothesis: No serial correlation at up to 2 lags

F- statistic	0.3497	Prob. F (2,16)	0.7101
Obs*R-squared	0.963367	Prob chi- square (2)	0.6177

Table 6:

Heteroskedasticity Test Breuch-Pagan-Godfrey

Null hypothesis: Homoskedasticity

F- statistics	2.275953	Prob F (4,16)	0.1011
Obs*R-squared	7.725397	Prob chi-square (4)	0.1022
Scaled explained SS	3.394854	Prob. Chi-square (4)	0.4940

The model passes with flying colors all diagnostic tests for serial correlation, autocorrelation, and heteroscedasticity. As the P value for Breusch- Godfrey serial correlation LM Test and Heteroskedasticity Test Breuch-Pagan-Godfrey both values are greater than 0.05 which states they are homoskedasticity and free of serial correlation.

Conclusion:

The objective of this study is to investigate the impact of monetary policy on economic growth of Nepal. For this purpose, GDP is taken as dependent variable and Broad Money Supply, Cash Reserve ratio and Interest Rate are taken as independent variables to show the long run and short run relationship. The study applies Johansen co-integration test to find long run relationship between the variables. It is used after Augmented Dickey- Fuller unit root test to remove the effect of spurious regression in the model. All variables are found non- stationary at level and found stationary at first difference so that Johansen co-integration test is implied to test the co-integration.

The outcome of Johansen's cointegration method shows that monetary indicators are crucial for GDP growth. The statistical significance of the negative coefficient of the error correction term indicates the likelihood of equilibrium convergence in each period with adjustment expressed by various terms. The computed model indicates that economic variables have a significant and favorable influence on Nepal's GDP growth. As a result, this essay supports the idea that money is a necessary component of economic progress. This finding that economic development is a positive function of monetary factors is in line with those of Ahamed, Afzal and Ghani (2016),as well as Hussain and Haque (2017).Therefore, to boost the nation's GDP development in the future, Nepal's monetary authority should implement an expansionary monetary policy.

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