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# Estimation of Multiflier Effect of Public Spending on Economic Growth under Multiple Regimes Regime

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**Abstract**

The paper estimates multiplier effect of public spending (total government spending) on economic growth (RGDP) from 44 years long time series data base of macro-economic variables from 1974-75 to 2018-19 (Panchayat Regime (1975-1990), Democracy I: Ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019)) through structure vector auto-regressive (SVAR) model with tests. The paper provides above three political regime based relationship between public spending and economic growth and multiplier of public spending on economic growth. As a result, in the three different regimes, their nature, behavior and dynamics are stationary. Except for real regular spending (RRS) in Democracy I: Ceremonial Monarch (1991-2005) and real capital spending (RCS) in Democracy II: Federal (2006-2019), all coefficient values of SVAR estimate shows significantly positive relationship between the government spending and economic growth. It indicates positive multiplier effect of public spending; recurrent spending and capital spending are positive to economic growth, except for GRRE in Democracy I: Ceremonial Monarch (1991-2005) and RCS in Democracy II: Federal (2006-2019). Likewise, in the different political regimes, higher multiplier of total public spending, regular public spending and capital public spending in the Panchayat Regime (1975-1990) is better than successive democratic regimes so called the people's centric political regimes: Democracy I: Ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019). Besides, except for the Panchayat Regime (1975-1990), the multiplier value of public spending; recurrent spending and capital spending are lower in Democracy I: Ceremonial Monarch (1991-2005) and then Democracy II: Federal (2006-2019). It indicates low efficiency of the government spending and budgetary system. Therefore, the government should improve efficiency of the public spending, ratio of the capital spending and private investment for improving the higher multiplier variable in long run.

*Keywords:* public expenditure, economic growth, multiplier effect, SVAR, Nepal.

## 1. Introduction

Heterogeneity effect of multiple regimes on decision and practice of public spending in the national economy is a core issue to ensure the expected target of multiplier effect on economic growth because of multiple economic school of thought and philosophy of multiple regimes. In the multiple regimes, three major philosophical drivers including open economy, mixed economy and command economy are prevalent more than others on the decision of public spending (Higgins, 2003 & Todaro, 2010). In open economy, public spending is limited mainly on economic infrastructure, human capital development, social security, research and technology development, and security goods, leaving all productions to the private sectors and distributions to the market. In mixed economy, the regime makes a fusion of market and command economy. However, in command economy, the regime believes only on the state led. In these multiple regimes, public spending nature and pattern is multiple having heterogeneity effects as multiplier effect on economic growth. This issue is a matter of concern to the policy maker and the scholars.

Releasing a big public spending in the budget under the expansionary fiscal policy to maintain macroeconomic stability and to achieve higher economic growth is an inbuilt fashionable popular practice not only in developed but also in developing countries as a miracle of discretionary decision, despite a resource constraint and ineffective capacity of regime machinery. This practice was a result of Keynesian Idea (Manikow, 2007, Blanchard, 2007). It is a popular Keynesian economics as a solution of the Great World Depression in 1936 (Keynes, 1967). In this school of thought, Keynes coined idea of the state led public spending to cure and revive national economy through expanding

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fiscal policy to boost up economic activities and employment. In the idea, Keynes in his General theory argued increasing public spending to solve demand deficit in labor and goods market through increasing aggregate demand for raising national income and employment (Keynes, 1967). Its result is the multiplier in the profit of the firms in the short and long run (Heijdra & Ligthart, 1997). Then after, big public spending has become a popular instrument of public finance in the world, particularly in the developing countries. Its evidences are found in the mild recession in the early 1990s, financial crisis in 2008 and the COVID led world economic recession in 2019 (ADB, 2020, IMF, 2020 & UN, 2020). Like the mild recession in the early 1990s, in 2008, financial crisis struck US economy and then the world (Fligstein, Brundage, & Schultz, 2014). In the recession, the US regime used once again Keynes Idea to expand public spending as special economic package to cure the economic recession. Similarly, in 2019, COVID19 recessed the global economy with negative growth rate. In the recession, all macroeconomic indicators were negative (ADB, 2020, IMF, 2020 & UN, 2020). Again, it was used with a positive multiplier effect.

Nepal is one of developing countries, where the historical facts and figures of the budgetary policy shows expansionary public spending as a popular instrument and mindset forever over 70 years in the resource constraint, despite the different philosophical multiple regimes (MoF, 2019). In the command economy (1975-1990), the tendency of the state was the state led development as well as regulated economy with the assumption that development is the state's responsibility. Similarly, in the imperfect market (1991-2005), it was consistent. Then, in the free market (2006-2019), it was still prevalent. Despite similar nature and pattern of public spending, lower economic growth is a big issue in the different regimes (Bista, 2021 & MoF, 2019). In the lower economic growth, poverty and inequality issues have been consistent and stagnant at the complex situation. The rate of unemployment was a critical (Bista, 2021). In sector economy, its result is poor productive transformation of sector economy including agriculture, industry and services sector in terms of output and employment. The primitive agriculture sector has dominated to the national and local economy in terms of output, employment, trade and raw materials. However, the subsistence agriculture could not respond properly disguised unemployment and poverty issues (Bista, 2021). As a result, current account and fiscal deficit have become wider than before. This macro-economic scenario has raised a query about multiplier effect of expansionary public spending on social and economic infrastructure and sector economy. Therefore, this study is a relevant.

On this issue, the past literatures (Chaudhary, 2010, Kharel, 2012, Bhusal, 2014, & Kunwar, 2019) have not covered in depth and widely focusing on public spending and its multiplier effect aspect particularly in Nepal. In this gap, this study has covered public spending and its multiplier effect. This study estimates multiplier effect of public spending in the multiple regimes of Nepal. Its output that is the calculated multiplier value will be valuable input to the policy makers for reengineering public spending policy, process and approach on the existing pattern of resource allocation and pattern. It would contribute to improve budgetary reform and its effectiveness.

## 2. Literature Review

Public spending is a fiscal measure to counter macro-economic crisis and fluctuation of the economy to achieve the expected macro-economic objectives: raising national income, employment generation and macro-economic stability. Its forms are transfer payments, public consumption and public investment (Lindbeck, & Weibull, 1988, Lekhi & Singh, 2015, Bose & Bhanumurthy, 2015, Munir & Riaz, 2020, Bista, 2021). Gal, López-Salido, & Vallés (2007) noted it as a positive response to household by incorporating price rigidities and non-Ricardian consumers. In the study of analyzing welfare effects of alternatives forms of public spending, Lindbeck, & Weibull, (1988) found positive impact on effective demand and then national income and employment.

In recent years, multiplier effect of public spending is a popular approach of macroeconomics theory. In this theory, Keynes argues expansionary public spending in economic recession for multiplier effects in national economy for rapid recovery and stability. This logic of the theory of consumption, saving, and employment in Keynesian Economics is a multiplier effect of public expenditures on different economic activities of the national economy's economic sectors for achieving the desired effects—stability, growth, and stimulation (Gupta & Verhoeven, 2001, Popa & Codreanu, 2010, Bista, 2016, and Bista, 2021). This efficiency of public expenditure can be measured by the multiplier, which shows a percentage point change in GDP in response to an increase in government expenditure (Gupta & Verhoeven, 2001; Hamer-Adams & Wong, 2018). Therefore, almost all countries have a higher rate of public expenditure to GDP ratio, particularly in capital expenditure to GDP ratio, in the world.

It is well said that the concept of multipliers is based on the success story of recovery from the Great World Recession in 1936 and the Global Financial Crisis in 2008 (Lekhi & Singh, 2015, Bose & Bhanumurthy, 2015, Munir & Riaz, 2020, Bista, 2021). In the theoretical literature on Keynes, four multipliers are explained, such as the investment

multiplier, budget multiplier, fiscal multiplier, and export trade multiplier (Lekhi & Singh, 2015). In the different economies and phases of the trade cycle, economic decisions and the behavior of the government create different multipliers, with desired or undesired results. In this context, Haavelmo (1945) argues for public spending with a multiplier as a remedy for unemployment and a driver of redistribution income in society. Pérez-Montiel (2020) broadens Haayelmo's (1945) narrow concept by discussing the dynamic multiplier of public investment and its effect on output levels. In Pérez-Montiel's (2020) estimation of government public investment dynamic multiplier effects, an empirical analysis for Spain from 1980-2016 found a positive and permanent effect on the level of GDP from the growth of public investment. One year after fiscal expansion, the dynamic fiscal multipliers of infrastructure investment and social investment reach values above one, thereby confirming that government public investment expansions have Keynesian effects on the level of output. In the study, the economic effect of public financing was Adelino, Cunha, and Ferreira (2017) discovered a local income multiplier with 1.9 local income multiplier and a cost per job of USD20, 000 per year when the local government increases expenditure. Besides, government spending through a deficit budget improves recovery during a recession.

In the study on Keynesian multipliers, direct crowding out and the optimal provision of public goods, Heijdra and Ploeg, (1996) found it as counter cyclical macro-economic policy in the monopolistic market. In the policy, public spending created aggregate demand and then multiplier. Thus, the multiplier existed. In the study of the Keynesian macroeconomic model in the monopolistic market, Startz (1989) found traditional multiplier in short run. However, in long run, disappearance of the multiplier was found. Its results were optimal private behavior and optimal social behavior.

Conducting the empirical study on government public investment dynamic multiplier effects in Spain using data sets from 1980 to 2016, Perez-Montiel (2020) found a positive and permanent effect of increasing public investment on the level of GDP as Keynesian multiplier effect through productive infrastructure investment and social investment.

Besides, the nature of public spending creates multipliers. Archibald (1967), Yoshida & Kenmochi (2011), and Yen, Ong, & Ooi (2015) have provided sector multipliers. Archibald (1967) mentioned the need for a multiplier in the regional economy in the UK. Similarly, in a two-sector model of monopolistic competition, Yoshida & Kenmochi (2011) found the growth of national income as a multiplier effect of government spending on health services in the short run but the reverse in the long run. Likewise, Yen, Ong, and Ooi (2015) found in the study, income and employment multiplier effects of the Malaysian higher education sector found larger direct and indirect income impacts of private higher education institutions (HEIS) on the private than the public, with 1.34 and 1.32 income multipliers on additional income for every initial ringgit of labor income, respectively. The private and public income and employer effects are 3.09 and 3.05, respectively. Higher education creates 1.21 workers per RM 10,000 invested.

Additionally, the effect of the multiplier depends on public spending decisions and the behavior of the government in the phase of trade cycles. For example, Batini, Eyraud, Forni, & Weber (2014) and Garry & Rivas Valdivia (2017) argue for time and accurate fiscal multiplier estimation. Because it allows policymakers to visualize the expected benefits of a change in government spending, both literatures consider this process valuable in assisting policy decisions and the design of targeted fiscal strategies (Garry & Rivas Valdivia, 2017).Likewise, Batini, Eyraud, Forni, & Weber (2014) emphasize the need to measure accurately the relationship between the two variables in order to plan and forecast the effect of policy actions. Therefore, the understanding of multipliers of public spending is relevant to measuring whether the nature and pattern of public spending are on the right course to achieve the desired effect on national output, national income, and employment level.

Large literatures on multiplier of public spending are available. In these literatures, multiplier effects of public spending are mixed with different values. Large literatures (Blanchard & Perotti, (2002), Fatás & Mihov (2002), Ramey, (2011); Bachmann & Sims (2012); Auerbach & Gorodnichenko (2012, 2017), Ilzetzki et al. (2013), Hernández de Cos & Moral-Benito (2013), Martínez & Zubiri (2014), Hory (2016), Gechert & Mentges (2018), and Afonso & Leal (2019)) found a positive value with below and above 1. However, few literatures (Perotti (2004) and Ilzetzki et al. (2013)) found negative value. Thus, public spending has a positive multiplier effect on national income and employment.

On this issue, none of the literature has assessed the multiplier of public spending in the national economy of Nepal, although Kharel (2012), Bhusal (2014), and Kunwar (2019) have shown that the expansion of government expenditure contributes positively to economic growth, while that by Chaudhary (2010) has proved that large government expenditure has a negative impact on economic development. Therefore, this study is relevant.

## 3. Objectives

The general objective of the study is to estimate multiplier effect of public spending on economic growth under the different regimes in Nepal. The specific objectives of this study are:

a) To estimate multiplier effect of public spending under the different regimes in Nepal.

b) To find out its policy implication

## 4. Methods

### *4.1. Conceptual Framework*

Multiplier effect is Keynes's basic idea in the theory of employment, income and output. His hypothesis is that autonomous government spending has a multiplier effect on aggregate demand and output of GDP through the growth of employment, income, and consumption (Diulo, 1983). In real, the change in real GDP is a multiplier effect of autonomous government spending. Thus, the relationship between government spending and economic growth is directly positive. It is shown in detail in figure 1.

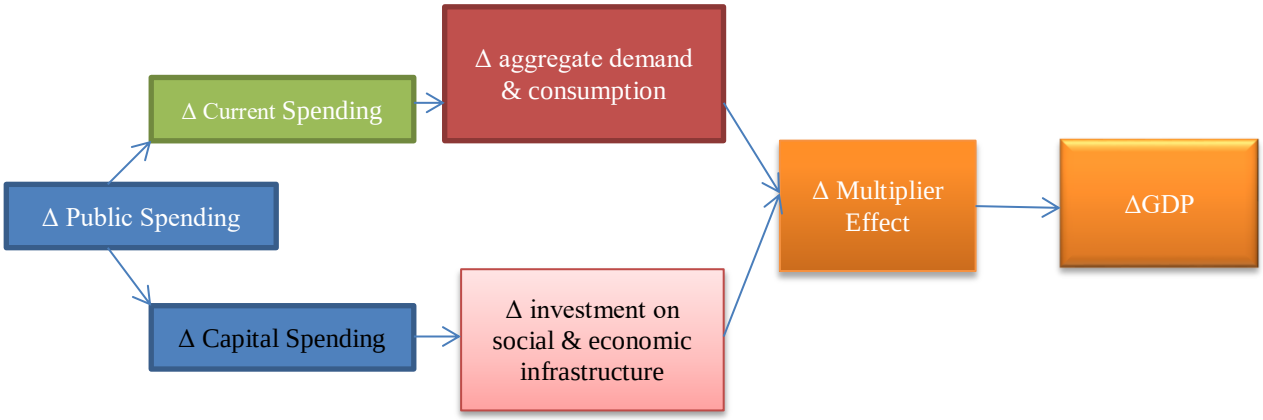


**Figure 1.** Framework for multiplier effect of public spending

In the concept of multiplier, the multiplier value depends on marginal propensity to consume (MPC), because MPC measures how much of the income generated from employment output is destined for autonomous public expenditure. In the theory of income, employment and consumption, income (Y) is the sum of consumption expenditure (C) and saving fraction (S). The remaining saving fraction (S) transfers capital formation and investment. Therefore, the change of investment is the result of change of autonomous public spending. An autonomous change in the rate of investment will initiate a multiplier process of income generation (Diulo, 1983). This increased income will raise consumption, which will induce further investment through the accelerator process. Hence, if we allow for the income-generating effects of both consumption and investment, the multiplier co-efficient (m) can be written as:

$$m = \frac{1}{1-(MPC+MPI)} \quad (1)$$

Where, MPC = marginal propensity to consume given by change in consumption to change in income.

MPI =marginal propensity to invest given by change in investment to change in income

### *4.2. Specification of Model*

In the literature of SVAR, Jain & Kumar (2013) mention the issue of simultaneity bias and endogeneity in the relationship between fiscal policy and economic growth with the solution of models incorporating instrumental variables or vector auto regression (VAR) framework to allow feedback effects. Besides, numerous studies (Sims, 1986; Blanchard, Perotti, 2002; Nafie & Atlam, 2019) have used the SVAR model on these variables.

The VAR model can be written in the reduced form equation as:

$$Y_t = C(L)Y_{t-1} + u_t \quad (2)$$

Where, C(L) represent N × N matrix polynomials in lag operator L for N × 1 vectors of endogenous variable ($Y_t$). $u_t$ is the N × 1 vector of reduced form innovations or shocks which are independent and identically distributed.

*4.3. Nature and Sources of Data Sets*

Research design was explorative cum descriptive under which quantitative data sets were employed. The nature of quantitative data sets was time series data of four macro variables such as real economic growth (REC), real total government expenditure (RTGE), real regular expenditure (RRE), and real capital expenditure (RCE). Its source was secondary including including Annual Government Financial Statistics, Nepal Rastra Bank(NRB), Annual Economic Survey and Budget, Ministry of Finance, Nepal and Annual Statistical Pocket Books, Central Bureau of Statistics (CBS), Nepal.

*4.4. Sample Size of Time Series Data sets*

The sample size of time series data for these major economic variables was 44 years from 1974-75 to 2018-19, out of 61 year long time series data sets from 1958 to 2019. The sample size was made because time series data sets were not properly recorded and accounted for from 1958 to 1974, although in 1959, a new accounting system was initiated, which was further revised and improved in 1963. Since 1974, the government of Nepal has initiated a scientific accounting and recording system. Therefore, a time series from 1974–75 to 2018–19 was selected.

*4.5. Techniques of Data Analysis*

By nature, time series data fluctuates due to regime and natural shocks as well as policy stimulators and stabilizers. Since the fluctuations may be non-stationary as well as seasonality, the fluctuation could change dynamic behavior and relationships of macro-variables. The SVAR model was employed to capture it. In this context, the following two steps: I: Unit Root test and II: Estimation of VAR and SVAR.

***Step I: Unit Root Test***

The unit root test is a preliminary test to understand whether time series data sets from 1974–75 to 2018–19 is stationary or not (Greene, 2010). If not stationary, it indicates the problem of spurious regression, i.e., if two variables are trending over time, a regression of one on the other could have a high R2 even if the two is unrelated. Secondly, if the variables in the regression model are not stationary, then it can be proved that the standard assumptions for asymptotic analysis will not be valid.

In other words, the usual t-ratios will not follow a t-distribution, so we cannot validly undertake the hypothesis tests about the regression parameters. Thus, before performing any kind of test or model, it is necessary to find out whether the data is stationary or not, and that can be done by using the unit root test.

Augmented Dickey-Fuller (ADF) test is used. Its ADF model unit root test is as follows.

$$\Delta y_t = a_1 + \delta\, y_{t-1} + \sum_{i=1}^{k} \beta_i\, \Delta y_{t-i} + u_t \quad (3)$$

The null hypothesis of ADF is $\delta=0$ against the alternative hypothesis of $\delta<0$. If null hypothesis is not rejected, the series is non-stationary, whereas rejection means the series is stationary.

***Step II: Vector Auto Regression (VAR) and Structural VAR***

Vector auto-regression (VAR) is a stochastic process model used to capture the linear interdependencies among multiple time series (Greene, 2010). It explains dynamic relationship of above these four macro variables and forecasting. A VAR model is a multi-equation system where all the variables are treated as endogenous. A VAR model with 'p' lags can be written in regression form as:

$$Y_t = \alpha + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \cdots + \beta_p Y_{t-p} + u_t \quad (4)$$

where,

$Y_t$ is the n × 1 vector of time series variables ($y_{1,t}$, $y_{2,t}$,…$y_{k,t}$)

$\alpha$ is the n × 1 vector of intercepts ($c_1$, $c_2$, …,$c_k$)
$\beta_i$ is the n × n matrix of co-efficient ($a_{1,1}^1$, ……$a_{k,k}^p$)
$u_t$ is the n × 1 vector of error terms ($e_{1,t}$, $e_{2,t}$,…$e_{k,t}$)

The VAR model in equation (4) is reduced form VAR model. The structural form of the VAR in equation (4) can be obtained by multiplying the equation with n x n matrix A as,

$$AY_t = A\alpha + A\beta_1 Y_{t-1} + A\beta_2 Y_{t-2} + \cdots + A\beta_p Y_{t-p} + Au_t$$

This leads

$$AY_t = C_1 Y_{t-1} + C_2 Y_{t-2} + \cdots + C_p Y_{t-p} + Be_t \quad (5)$$

Where, B and C are n x n matrices of coefficients. Matrix A captures contemporaneous relations among the endogenous variables and is the n-dimensional vector of the structural shocks that we want to recover.

In the model lag was selected by the performance of the model including lag selection criteria are: a) Akaike (AIC), b) Schwarz-Bayesian (BIC) and c) Hannan-Quinn (HQ)

***Step III: Residual Diagnostics***

The estimated VAR models were tested for serial correlation using Breush-Godfrey Serial Correlation LM tests and for normality using the Jarque-Bara residual normality test. The stability of the model is checked using the inverse roots of the characteristic autoregressive polynomial. The various forms of tests are dependent upon the software E-Views.

## 5. Empirical Analysis

### *5.1. Results*

In this section, three SVAR models were analyzed under multiple regimes: command economy (Panchayat period) (1975 to 1990), Monopolistic (Democracy with constitutional Monarchy) (1991 to 2005) and Open market (Federal Republic System) (2006 to 2019).

**Result I: Descriptive Statistics of Public Spending and Public Spending – GDP Ratio**

**Table 1.** Descriptive Statistics of Public Spending

| Description | Min. | Max. | Mean | Std. Deviation |
|---|---|---|---|---|
| RRS | 4 | 20 | 9.64 | 5.22 |
| RCS | 4 | 12 | 8.18 | 3.08 |
| RTS | 13 | 33 | 20.02 | 5.48 |
| EG | 1.64 | 5.80 | 4.43 | 1.25 |

Source: the calculated from data sets of MoF (1975-2019)

Table 1 presents mean and standard deviation of key variables of trend analysis. In column 1, there are four variables: Real Regular Spending (RRS), Real Capital Spending (RCS), Real Total Spending (RTS) and Economic Growth (EG). Thus, mean of these variables represent properly time series data of RRS, RCS, RTS and EG.

**Table 2.** Share of TGS and Ratio to GDP

| Regimes | | % share of TGS | | | as ratio to GDP | | |
|---|---|---|---|---|---|---|---|
| | Year | RRS | RCS | RFS | RRS | RCS | RTGS |
| Panchayat Regime | 1975-1990 | 30.99 | 66.7 | 2.31 | 5.22 | 11.34 | 16.97 |
| Democracy I: Ceremonial Monarch | 1991-2005 | 46.79 | 45.66 | 7.56 | 8.35 | 8.24 | 17.93 |
| Democracy II: Federal | 2006-2019 | 64.51 | 22.10 | 13.39 | 16.32 | 5.58 | 25.32 |

Source: the calculated from data sets of MoF (1975-2019)

Table 2 presents mean and standard deviation of key variables of trend analysis. In row, there are three variables RRS, RCS, and RTS. In column 1, there are three periods: Panchayat Regime (1975-1990), Democracy I: ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019). Thus, average percentage share of TGS and ratio to GDP of these variables represent properly cross sectional data of RRS, RCS, and RTS.

**Result II: ADF Unit Root Test Stationary Test**

Table 3 presents the result of unit root test or Augmented Dickey-Fuller test over three different political regimes of Nepal from 1975 to 2021. In column 1, there are three regimes Panchayat (1975-1990), Democracy with Constitutional Monarch (1991-2006) and Democracy without Monarch (Federal Republic System)(2007-2021). In column 2, there are levels and differences. In column 3, there are variables including t-statistics and probability. Similarly, in row 1, there are five key variables: GRTGS, GRRS, GRCS, GRGDP, and GRTAX out of which GRGDP is dependent variable and GRRS, GRCS, GRTAX and GRTGS are independent variables.

**Table 3.** Result of ADF Unit Root Test of Variables under Different Political Regime

| Regimes | | Variable | GRTGS | GRRS | GRCS | GRGDP | GRTAX |
|---|---|---|---|---|---|---|---|
| Panchayat | Level | t-Statistic | -3.330891 | -3.560862 | -3.186134 | -4.466294 | -5.466648 |
| | | Prob.* | 0.0333 | 0.0222 | 0.043 | 0.0044 | 0.001 |
| Democracy with constitutional monarchy | Level | t-Statistic | -4.227146 | -4.728333 | -3.337 | -4.672835 | -2.907851 |
| | | Prob.* | 0.0051 | 0.0019 | 0.0292 | 0.0021 | 0.0652 |
| | 1st Difference | t-Statistic | | | | | -4.567706 |
| | | Prob.* | | | | | 0.0033 |
| Federal republic system | Level | t-Statistic | -2.630738 | -2.67886 | -2.146484 | -2.661045 | -5.393828 |
| | | Prob.* | 0.0127 | 0.1107 | 0.2331 | 0.1136 | 0.0029 |
| | 1st Difference | t-Statistic | | -3.523761 | -4.836709 | -4.195106 | |
| | | Prob.* | | 0.0345 | 0.0058 | 0.0136 | |

Source: the calculated from data sets of MoF (1975-2019)

**Result III: Lag Length Selection**

Table 4 presents the result of selection of appropriate lag length. In column 1, there are different lags from 0 to 4 for three models for GRTGS, GRRS and GRCS. In row 1, there are variables: lag, log L, LR, FPE, AIC, SC, and HQ.

**Table 4.** Result of VAR Lag Order Selection Criteria

| Sample: 1975 2019 | | | | | | |
|---|---|---|---|---|---|---|
| Lag | LogL | LR | FPE | AIC | SC | HQ |
| Endogenous variables: GRTGS, GRGDP GRTAX (Model 1) | | | | | | |
| 0 | -365.628 | NA | 20288.34 | 18.4314 | 18.55807* | 18.4772 |
| 1 | -352.6495 | 23.36144 | 16661.46 | 18.23247 | 18.73914 | 18.41567* |
| 2 | -343.3647 | 15.31993 | 16572.86 | 18.21823 | 19.10489 | 18.53882 |
| 3 | -331.7437 | 17.43148* | 14854.07* | 18.08718* | 19.35384 | 18.54517 |
| 4 | -323.4724 | 11.16624 | 16048.22 | 18.12362 | 19.77028 | 18.719 |
| Endogenous variables: GRRS GRGDP GRTAX (Model 2) | | | | | | |
| 0 | -374.9329 | NA | 32307.19 | 18.89665 | 19.02331* | 18.94244 |
| 1 | -359.5409 | 27.70559* | 23515.76* | 18.57705* | 19.08371 | 18.76024* |
| 2 | -353.2588 | 10.36541 | 27179.85 | 18.71294 | 19.5996 | 19.03353 |
| 3 | -350.6583 | 3.90076 | 38244.78 | 19.03292 | 20.29958 | 19.4909 |
| 4 | -344.7514 | 7.974337 | 46504.52 | 19.18757 | 20.83423 | 19.78295 |

| Sample: 1975 2019 | | | | | | |
|---|---|---|---|---|---|---|
| Lag | LogL | LR | FPE | AIC | SC | HQ |
| Endogenous variables: GRCS GRGDP GRTAX (Model 3) | | | | | | |
| 0 | -400.6272 | NA | 116746.3 | 20.18136 | 20.30802* | 20.22716 |
| 1 | -385.8851 | 26.53563* | 87784.33* | 19.89426* | 20.40092 | 20.07745* |
| 2 | -379.6995 | 10.20635 | 101952.6 | 20.03497 | 20.92164 | 20.35556 |
| 3 | -371.9891 | 11.56554 | 111112.8 | 20.09946 | 21.36612 | 20.55744 |
| 4 | -366.8916 | 6.881651 | 140690 | 20.29458 | 21.94124 | 20.88996 |

Source: the calculated from data sets of MoF (1975-2019)

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

**Result IV: SVAR models Estimation**

Table 5 presents the result of the SVAR estimation over three different political regimes of Nepal from 1975 to 2021. In column 1, there are three regimes Panchayat (1975-1990), Democracy with Constitutional Monarch (1991-2006) and Democracy without Monarch (Federal Republic System)(2007-2021). In column 2, there are values of coefficient variable, std. error, z-statistics and probability. Similarly, in row 1, there are results of three models: model 1 for GRTGS, model 2 for GRRS, and model 3 for GRCS. In three models, GRGDP is dependent variable and GRRS, GRCS, GRTAX and GRTGS are independent variables.

**Table 5.** Result of SVAR Estimation

| Regimes | | Model 1 (GRTGS) | | Model 2 (GRRS) | | Model 3 (GRCS) | |
|---|---|---|---|---|---|---|---|
| Regime | Value | C(1) | C(2) | C(1) | C(2) | C(1) | C(2) |
| Panchayat | Coefficient | 0.231544* | 3.009613* | 0.346217* | 2.046232* | 0.178018* | 3.42089* |
| | Std. Error | 0.005897 | 0.081835 | 0.010118 | 0.055306 | 0.004405 | 0.092677 |
| | z-Statistic | 39.26319 | 36.77645 | 34.21748 | 36.99845 | 40.41325 | 36.91194 |
| | Prob. | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Democracy | Coefficient | 0.096589* | 2.797396 | -0.08199* | 2.280127* | 0.04383* | 2.733886* |
| | Std. Error | 0.017223 | 0.107603 | 0.007303 | 0.103237 | 0.005208 | 0.109038 |
| | z-Statistic | 5.608303 | 25.99749 | -11.22659 | 22.0864 | 8.415432 | 25.07279 |
| | Prob. | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| FDRN | Coefficient | 0.017492*** | 1.857264 | 0.245457* | -1.057902* | 0.010113 | 0.239918** |
| | Std. Error | 0.010514 | 0.108887 | 0.012265 | 0.0878 | 0.011346 | 0.105578 |
| | z-Statistic | 1.663743 | 17.05675 | 20.01225 | -12.04903 | 0.89133 | 2.272422 |
| | Prob. | 0.0962 | 0.0000 | 0.0000 | 0.0000 | 0.3728 | 0.0231 |

Source: the calculated from data sets of MoF (1975-2019)

* Significant at one percent level, ** significant at five percent, *** significant at ten percent

*5.2. Discussion*

Considering above descriptive results of the time series data sets over three political regimes (Panchayat Regime (1975-1990), Democracy I: ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019)) from 1974 to 2019 as the sample for three public spending variables: GRTGS, GRRS and GRCS and economic growth variable (GRGDP), they provide a strong evidence of the relationship between GRGDP, GRTGS, GRRS and GRCS. The descriptive statistics result is of the status of public spending and economic growth over above mentioned three political regimes. In the descriptive results, their means represent properly time series data of GRRS, GRCS, GRTS and GRGDP without more deviation. In simple, above time series data might be free from non-stationary.

Similarly, descriptive results as percentage share of GRTGS and as ratio to GDP over above three political regimes provide a strong evidence of inclining trend of GRRS and GRFS as well as of GRRS-GDP ratio and GRTGS-GRGDP ratio from Panchayat Regime to Democracy I and Democracy II, except declining trend of GRCS share of GRTGS and GRCS-GRGDP ratio from Panchayat Regime to Democracy I and Democracy II.

Above results of Augmented Dickey-Fuller (ADF) unit root tests on time series data of GRTGS, GRRS and GRCS and GRGDP over three political regimes (Panchayat Regime (1975-1990), Democracy I: ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019)) from 1974 to 2019 provides strong evidence of no unit root with less than 5% of the p-value for all variables. All variables are stationary over the 44 year period over three political regimes (Panchayat Regime (1975-1990), Democracy I: Ceremonial Monarch (1991-2005)), except GRTAX at first difference level. In this way, the null hypothesis that the variable over three political regimes has a unit root is rejected, and the alternative hypothesis is accepted. However, In Democracy II: Federal (2006-2019), only GRTGS and GRTAX are stationary at level. GRRS, GRCS and GRGDP are stationary at first difference. This could be because of very low observation sample during this period.

Considering above results of lag length selection based on the result of AIC for lag length selection for study under different regime is to proceed with minimum lag i.e., 1 lag and gradually increase lag length until problem of serial auto correlation disappears. In the study, optimal lag length remained 1 for all models under all three political regimes (Panchayat Regime (1975-1990), Democracy I: Ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019)).

Above result of the three models provide a strong evidence of the relationship between public spending and economic growth over (Panchayat Regime (1975-1990), Democracy I: Ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019)).

In Panchayat Regime (1975-1990), the result of Model 1: An SVAR model between GRGDP (dependent) and independent variables such as GRTGS (C1) and GRTAX (c2) provides a positive sign, indicating a positive relationship with 0.23 values and 3.00 values respectively. This variable is significant because it has a 0.0 p-value. It means that in a structural disturbance of GRGDP, one unit of growth shock of total government spending (GRTGS) increases by 23.15 percent.

Similarly above result of the model II between GRGDP (dependent) and independent variables such as GRRS (C1) and GRTAX (c2) provides a strong evidence of their positive relationship with 0.3461 coefficient value and 2.04 coefficient value respectively. This variable is significant because it has a 0.0 p-value. It means that in a structural disturbance of GRGDP, one unit of growth shock of total government spending (GRRE) increases by 34.61 percent.

Likewise, above result of the model III between GRGDP (dependent) and independent variables such as GRCS (C1) and GRTAX (c2) provides a strong evidence of their positive relationship with 0.1780 coefficient value and 3.08 coefficient value respectively. This variable is significant because it has a 0.0 p-value. It means that in a structural disturbance of GRGDP, one unit of growth shock of total government spending (GRCE) increases by 17.80 percent.

The result reveals the occurrence of a positive multiplier of total government spending (GRTGS, GRRS and GRCS) on the economic growth of Nepal in Panchayat Regime (1975-1990). In this regime, the multiplier of GRRE is greater than GRTGS and GRCS. Surprisingly, the multiplier value of the GRCE is lowest of all. To some extent, the budgetary and public spending policies are effective to achieve the desired effect on national output, national income, and employment, and so on. The lower coefficient value of the capital spending raises a query against the budgetary and public spending policies. Despite proper structure of capital and regular spending, the capital programs have issue of leakages and inefficiency in the absence of socio-economic and physical infrastructure and institutional system.

In Democracy I: Constitutional Monarch (1991-2006), the result of Model 1 provides a strong evidence of a positive relationship with 0.09 values and 2.79 values respectively. Both variables are significant because it has a 0.0 p-value. It means that in a structural disturbance of GRGDP, one unit of growth shock of total government spending (GRTGS) increases by 9.65 percent.

Similarly above result of the model II between GRGDP (dependent) and independent variables such as GRRS (C1) and GRTAX (c2) provides a strong evidence of negative relationship with 0.08 coefficient value and 2.28 coefficient value respectively. This variable is significant because it has a 0.0 p-value. It means that in a structural disturbance of GRGDP, one unit of growth shock of total government spending (GRRS) decreases by- 8.19 percent.

Likewise, above result of the model III between GRGDP (dependent) and independent variables such as GRCS (C1) and GRTAX (c2) provides a strong evidence of their positive relationship with 0.043 coefficient value and 2.75 coefficient value respectively. This variable is significant because it has a 0.0 p-value. It means that in a structural disturbance of GRGDP, one unit of growth shock of total government spending (GRCS) increases by 4.3 percent.

The result reveals the occurrence of a positive multiplier of total government spending (GRTGS, and GRCS) on the economic growth of Nepal in Democracy I Regime (1991-2006) but negative multiplier of GRRS on the economic growth of Nepal. In this regime, the multiplier of GRTGS and GRCS is greater than GRRS. Surprisingly, the multiplier value of the GTGS, GRCS and GRRS are lower. It might be 15 years data sets of Democracy I. The result indicates weak and ineffective budgetary and public spending policies to achieve the desired effect on national output, national income, and employment, and so on. Despite proper structure of capital and regular spending, the conflict (1996-2006) had badly disrupted the function of the government as well as the execution of the development programs with their red territory and the people's government. Besides, leakages and inefficiency of the government were reducing the performance of the government and the state machinery

In Democracy II: Federal Republic (2007-2020), the result of Model 1 provides a strong evidence of a positive relationship with 0.017 values and 1.85 values respectively. Both variables are significant because it has a 0.0 p-value. It means that in a structural disturbance of GRGDP, one unit of growth shock of total government spending (GRTGS) increases by 1.7 percent.

Similarly above result of the model II between GRGDP (dependent) and independent variables such as GRRS (C1) and GRTAX (c2) provides a strong evidence of negative relationship with 0.245 coefficient value and -1.057 coefficient value respectively. This variable is significant because it has a 0.0 p-value. It means that in a structural disturbance of GRGDP, one unit of growth shock of total government spending (GRRS) decreases by24.5 percent.

Likewise, above result of the model III between GRGDP (dependent) and independent variables such as GRCS (C1) and GRTAX (c2) provides a strong evidence of their positive relationship with 0.010 coefficient value and 0.251 coefficient value respectively. This variable is insignificant because it has a 0.37 p-value. It means that in a structural disturbance of GRGDP, one unit of growth shock of total government spending (GRCS) increases by 1.0 percent.

The result reveals the occurrence of a positive multiplier of total government spending (GRTGS, GRRS, and GRCS) on the economic growth of Nepal in Democracy II Regime (Federal Republic Regime) (1991-2006). In this regime, the multiplier of GRRS is greater than GRTGS and GRCS. Surprisingly, the multiplier value of the GRTGS and GRCS are lower. It might be 14 years data sets of Democracy II. Except for multiplier of GRRS, the multiplier of GRTGS and GRCS are so weak that indicates weaker and more ineffective budgetary and public spending policies to achieve the desired effect on national output, national income, and employment, and so on. In the result, the multiplier of GRCS is insignificant. Its reason might be improper structure of capital and regular expenditure, prolong transitional period (1907-2015), poor financial governance of the government and poor economic reforms to improve public spending system and budgetary policy.

In the different political regimes: (Panchayat Regime (1975-1990), Democracy I: Ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019)), the result of SVAR provides a strong evidence of the positive relationship between total public spending (GRTGS) and economic growth rate (GRGDP). In the Panchayat Regime (1975-1990), the multiplier of GRTGS is more powerful than Democracy I: Ceremonial Monarch (1991-2005) and then Democracy II: Federal (2006-2019). Similarly, the result of SVAR provides of the mixed relationship between regular public spending (GRRS) and economic growth rate (GRGDP). In the Panchayat Regime (1975-1990) and Democracy II: Federal (2006-2019), the multiplier of GRRS is higher value than Democracy I: Ceremonial Monarch (1991-2005). It means GRRS is more powerful in the Panchayat Regime (1975-1990) and Democracy II: Federal (2006-2019) than

Democracy I: ceremonial Monarch (1991-2005). Differently, the result of SVAR provides of the mixed relationship between capital public spending (GRRS) and economic growth rate (GRGDP). In the Panchayat Regime (1975-1990) and Democracy I: Ceremonial Monarch (1991-2005) the multiplier of GRCS is higher value than Democracy II: Federal (2006-2019). It means GRCS is more powerful in the Panchayat Regime (1975-1990) than Democracy I: Ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019).

Above results of SVAR in the different political regimes provides a strong evidence of higher multiplier of total public spending, regular public spending and capital public spending in the Panchayat Regime (1975-1990) better than successive democratic regimes so called the people's centric political regimes: Democracy I: Ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019). In the results, public spending system, budgetary system and capital spending system in the Panchayat Regime (1975-1990) is more efficient, more effective and more productive than Democracy I: Ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019). Relatively, public spending system, budgetary system and capital expenditure system in Democracy I: Ceremonial Monarch (1991-2005) is efficient more than Democracy II: Federal (2006-2019). The result of descriptive statistics verifies this result in the capital public expenditure. In the Panchayat Regime (1975-1990), its capital expenditure is more than 90 percent. In Democracy I: Ceremonial Monarch (1991-2005), its range is 60-70 percent but in Democracy II: Federal (2006-2019), its range is 40-50 percent. Thus, the financial system of the government has been weaker than before in Democracy II: Federal (2006-2019). It indicates urgent big economic reforms to improve efficiency, effectiveness and productivity of capital budget to achieve higher economic growth and rapid development.

## 6. Conclusions

The paper estimates multiplier effect of public spending (total government spending) on economic growth (RGDP) from 44 years long time series data base of macro-economic variables from 1974-75 to 2018-19 (Panchayat Regime (1975-1990), Democracy I: Ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019)) through SVAR model with tests. The paper provides above three political regime based relationship between public spending and economic growth and multiplier of public spending on economic growth. As a result, the SVAR model uses time series data sets of macro variables. In the three different regimes, their nature, behavior and dynamics are stationary. Except for GRRE in Democracy I: Ceremonial Monarch (1991-2005) and GRCS in Democracy II: Federal (2006-2019), all coefficient values of SVAR estimate shows significantly positive relationship between the government spending and economic growth. It indicates positive multiplier effect of public spending; recurrent spending and capital spending are positive to economic growth, except for GRRS in Democracy I: Ceremonial Monarch (1991-2005) and GRCS in Democracy II: Federal (2006-2019). Similarly, another result is the different level of multiplier value in which these three spending, the multiplier effect of recurrent spending is found to be more prominent than capital spending to induce economic growth against priori expectation. In short run, the multiplier effect is promising but in long run, it is lower. This is probably due to leakages in the economy, corruption and improper management of development fund, seasonal expenditure trend, and poor management of development projects. Likewise, in the different political regimes, higher multiplier of total public spending, regular public spending and capital public spending in the Panchayat Regime (1975-1990) is better than successive democratic regimes so called the people's centric political regimes: Democracy I: Ceremonial Monarch (1991-2005) and Democracy II: Federal (2006-2019). Besides, except for the Panchayat Regime (1975-1990), the multiplier value of public spending; recurrent spending and capital spending are lower in Democracy I: Ceremonial Monarch (1991-2005) and then Democracy II: Federal (2006-2019). It indicates low efficiency of the government spending and budgetary system. Therefore, the government should improve efficiency of the public spending, ratio of the capital spending and private investment for improving the higher multiplier variable in long run.

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