# THE CAUSALITY BETWEEN ECONOMIC GROWTH AND PUBLIC DEBT IN NEPAL: TODA-YAMAMOTO APPROACH

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**Abstract**

*This research paper investigated the causality between economic growth and public debt in Nepal using the time series data from 1975 to 2020. The study applies the Granger non-causality procedure developed by Toda and Yamamoto in a vector autoregression (VAR) model. Variables are real GDP, foreign debt, domestic debt and foreign currency reserve. The empirical results point out that one-way Granger causality running from real gross domestic product to domestic debt whereas foreign debt cannot be caused by all three variables. Similarly, foreign currency reserve also cannot be caused by all three variables. No causality between foreign currency reserve and domestic debt is found. Surprisingly internal debt cannot affect real gross domestic product. This result reveals that rather one-way Granger causality running from foreign currency reserve and foreign debt to real gross domestic product for the mentioned time period. No unidirectional causality among the variables was found in the result. The policymakers should take into consideration of this conclusion and should adopt more structural reforms to collection of domestic debt.*

**Key words:** Real GDP, foreign debt, domestic debt, foreign currency reserve, Toda-Yamamoto approach
**JEL Classification:** E01, E44, F62, F63, N15

## 1. Introduction

Nepal is least developed country with single digit economic growth and very poor utilization of resources. In the developing country, national debt may have the important role for the internal resource utilization and reduce the resource gap. Massive investment in infrastructure, technological innovation and development, human capital, and environmental protection is required to boost up economic activities towards achieving this goal. Taxation and public borrowing are two major sources of funds to finance such investment requirements (Bhatta and Mishra, 2019). When the government's revenue is less than its expenditure, the government borrows. Thus public debt is an important

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tool for governments to fund public spending, especially when it is difficult to raise taxes. Over the years, this process has left many governments with huge debts. Proper lending for public financing and infrastructure development is key to rapid economic growth. But borrowing more without a proper investment plan can lead to heavy debt burden and interest payments, which can have many unintended effects on the economy (Joy & Panda, 2020). High public debt is also an important issue for economically poor countries as it can create uncertainty and low economic growth. However the traditional view is that public debt has a positive effect on economic growth in the short term by stimulating aggregate demand and production.

The high debt-to-GDP ratio is also a source of concern for investors, as it could have a negative impact on the stock market and reduce productive investment and employment in the long run (Saungweme et al., 2019). Public debt, therefore, can be an economic stimulus but when its accumulation reaches a very significant level. Similarly, the growing debt burden could undermine the government's ability to pursue more productive investment programs in infrastructure, education and public health (Johnny & Johnnywalker, 2018).

For countries with poor economic structure, high public debt is also a critical issue since it can create uncertainty and low economic growth. The rationale for government borrowing is based on neoclassical growth models, which require countries that lack capital to borrow to increase their capital accumulation and steady-state levels of per capita production (Madow et al., 2021). The occurrence of the global economic crisis has provided additional incentives for developing countries like Nepal to borrow.

Classical theory suggests that public debt is a burden to future generations and in the long term debt drags the investment. Similarly, Ricardian theory recommends that public debt is same as future tax (Barro, 1979). On the contrary, Keynesian argument is that government borrowing plays the role of encouraging, in the short run, a reasonable stock of public debt. Antonio and Joao (2012) depict that due to high debt, the future tax will increase, so consumption will be reduced and resulting into a lower investment and employment opportunities.

High debt burden also encourages capital flight through creating risks of devaluation, increases in taxation and thus the desire to protect the real value of financial assets (Mohd and Yusuf, 2021). Capital flight in turn reduces domestic savings and investment, thus reducing growth, the tax base and debt servicing capacity. Public debt can jeopardize economic growth through high long-term interest rates, high inflation, and high future distorted taxes (Mhlaba et al., 2019). Extensive use of domestic loans can have serious implications for the economy. Domestic loan services can consume a significant portion of government revenue, especially since the domestic interest rate is higher than that of foreign. Especially in poor financial markets, the interest cost of

a home loan can rise sharply with the rise in outstanding debt stocks. In the long run, higher interest rates will discourage investment. Low investment ultimately leads to low stable-state capital stocks and lower levels of production. Therefore, the overall long-term impact of the loan will be smaller total output and ultimately lower consumption and lower economic well-being.

Policy analysts are concerned about the recent rise in the level of growth in government debt and debt service payments between low levels of growth and rising poverty in Nepal. This uncertainty prompted the study to examine whether the rising debt profile has an impact on Nepal's economic growth and to determine whether such an impact is long-term or short-term. With the improvement in the level of poverty and the acceleration of debt reduction to strengthen economic growth, it is important to make a detailed study of the long-term and short-term impact of government debt on economic growth. It is necessary to maintain financial discipline to increase domestic resource mobilization, reduce fiscal deficits, reduce the level of government debt and help the economy move towards higher growth.

## 2. Overview of Public Debt in Nepal

As government revenue sources are insufficient for increasing government expenditure, it is necessary to take government loans. Excessive reliance on low tax capacity has led to weak revenue growth in Nepal's economy. The country's debt stocks have risen sharply in recent decades. The associated repayments of these loans and services often result in a shift in productive funds toward debt repayment.

It is compared with the GDP of a nation to measure the magnitude of national debt. As per the latest data, the country with highest national debt is Japan which has 238 percent debt to GDP ratio followed by Greece 177 percent. Surprisingly, the USA tops debt to GDP ratio chart, with 107 per cent. On the flip side, Brunei has the lowest debt to GDP ratio of 2.4 per cent followed by Afghanistan 7.1 per cent. Out of about 168 countries which owe national debt, Nepal is ranks 129th position from the top by its debt to GDP ratio of 40.16 percent compared to 30.4 per cent in previous year. If we compare the SAARC nations, Bhutan tops the chart 110 percent followed by India 69.62 percent Sri Lanka 86.8 percent Pakistan 84.8 percent and Nepal 40.16 percent accounting 1.41 trillion fiscal year 2019- 20.

The government has been relying on internal and external debt to fill the resource gap between the 2015 earthquake and the recent Corona virus epidemic. Although the country's debt liability has been increasing at a slow pace till the fiscal year 2015-16, it has increased as the country has to mobilize huge resources for post-earthquake reconstruction. The country needs more resources to institutionalize post-2017 federalism, which has had a devastating effect on the country's economy, leading to a

decline in government revenue, resulting in the country's debt nearly tripling in the past six years.

For economically poor country like Nepal it is necessary to manage internal and external debt to invest in large infrastructure projects so that the potential infrastructure development can be put to good use. It is not a question of whether Nepal will borrow more or not, but the loan has been utilized fruitfully or not. There is still a belief in the country that there is a place for 'fiscal space' or additional borrowing. As long as our debt level is 50 to 60 percent of GDP, it is suggested that debt be sustainable. The productive use of debt can boost our economy and economic expansion is needed to increase the country's debt repayment capacity. However, the completion of important development projects has been delayed due to the inability of the government to spend the available resources both domestically and externally. Most projects of national pride have increased time and cost.

According to the mid-term review of the budget for the current fiscal year, only 15 percent of the total allocation budget has been spent on projects of national pride in the first quarter of the current fiscal year. There are many arguments in favor of borrowing because many countries have developed rapidly, borrowed heavily and used it wisely, especially in infrastructure development. They have 100 percent debt to GDP ratio but they are rich now.

## 3. Review of Literature

Investigation was conducted by Mohd and Yusuf (2021) on the effect of government debt on Nigeria's economic growth using annual data from 1980 to 2018 and the Autoregressive Distributed Lag technique. The empirical results showed that external debt constituted an impediment to long-term growth while its short-term effect was growth enhancing. Domestic debt had a significant positive impact on long-term growth while its short-term effect was negative. In the long term and short term, debt service payments led to growth retardation confirming debt overhang effect. The findings suggested that the government should direct the borrowed funds to the diversification of the productive base of the economy. Bhatta and Mishra (2020) investigated the relationship between economic growth and several other factors such as investment, trade openness, population growth, domestic savings, and government debt in the context of Nepal. The debt-growth relationship has been estimated by regression analysis and further explored the non-linear relationship between public debt and economic growth using time series annual data for the period of 1976-2019. The ARDL bound technique has been applied to estimate the short-run and the long run impact of debt on economic growth. The estimated parameters confirm the optimum public debt to GDP ratio in the context of Nepal is 33 percent. The policy implication of this finding for the Government of Nepal is to ensure public debt management in

line with the growth maximizing debt threshold. Ashfaq and Padda (2019) investigated the optimal level of public debt for the economic growth of Pakistan using the time series data from1973 to 2018. They explored the non-linear relationship between public debt and economic growth using ARDL bound test technique. They found that the optimal level of public debt is 60% of GDP. It also indicates that increase in government borrowings will raise economic growth in Pakistan in the long run. Mhlaba et al. (2019) employ the ARDL method and quarterly data from 2002 to 2016 to examine the long-run and short-run effects of public debt on economic growth for South Africa. The study modelled GDP as a function of gross and net debt, investment, inflation and terms of trade. The empirical results indicated a significant negative impact of public debt on economic growth. The study was based on South African data and provided a basis to examine the impact of government debt on economic growth from a Nigerian-specific perspective.

Saungweme and Odhiambho (2019) explored the causal relationship between government debt, debt servicing and economic growth in Zambia for the period 1979 to 2017 using a dynamic multivariate ARDL approach. To achieve this objective, RGDP was modelled as a function of stock of public debt, fiscal balance and savings as a share of GDP. The empirical results indicated a unidirectional causal relationship from economic growth to public debt in Zambia. Shkolnyk & Koilo (2018) examines the relationship between external debt and economic growth in emerging economies for the period 2006-2016. The authors used different econometric tools, e.g., ADL model and correlation analysis. The authors established that high level of external debt, in conjunction with macroeconomic instability, impedes economic growth in such countries. Bhattarai (2013) analyzed the assessment of public debt in Nepal using the data set from 1975 to 2011. This study is based on the descriptive analysis. The share of external loan, on average, seems to be relatively higher, i.e. 58.85% whereas such share of internal loan is 41.15%. However, in the latter period, the share of internal loan has significantly higher than the share of external loan. For example, during the period of 2005/06-2010/11, the average share of internal loan is 68.01% whereas such share of external loan is 31.99%. In spite of increased budget and increased public debt, the growth rate of economy is relatively low. On average, it is 4.28%. But, the rate of inflation is, on average, 8.31%. Thus, Nepalese economy is facing the problem of low rate of economic growth and high rate of inflation.

Rother and Westphal (2012) investigated the average impact of government debt on per-capita GDP growth in twelve euro area countries over a period of about 40 years starting in 1970. It found a non-linear impact of debt on growth with a turning point – beyond which the government debt-to-GDP ratio has a negative impact on long-term growth – at about 90–100% of GDP. Confidence intervals for the debt turning point suggested that the negative growth effect of high debt might start already from levels of around 70 to 80% of GDP. The channels through which government debt is found

to have a non-linear impact on the economic growth rate are private saving, public investment and total factor productivity. Akram (2011) investigated the way in which growth and investment is influenced by government debt. The data from 1972-2009 was used for the analysis. Autoregressive Distributed Lag (ARDL) technique was used. It explored that a negative relationship exists between foreign debt and investment per capita GDP. The outcomes of the research are aligned to the existence of the Debt overhang effect. However, the crowding out hypothesis hindered confirmation as there were no considerable relationships between per capita GDP, investment and debt servicing. It could therefore be concluded that it reflects to crowd out private investment.

A lot of literature has focused on the relationship between public debt and economic growth, but there are currently few studies on public debt as a factor influencing economic growth. In consequence, this study aims to fill this gap in this field of knowledge.

## 4. Data and Methodology

Toda-Yamamoto is run by using E-views version 9 software for the model. The data are analyzed with E-Views version 9. Long run and short run relationship among economic growth and public debt represented by internal debt, foreign debt and foreign currency reserve are analyzed using yearly data from the period 1975 to 2020.

Among four variables, three variables internal debt, real gross domestic product and foreign currency reserve are stationary at first difference while one variable foreign debt is stationary at level. We use Toda-Yamamoto as variable are mixed at order of integration. Actually in time series studies, the selection of the model is an art not a mathematical science.

In this study, public debt is classified into two parts internal debt and foreign debt. Foreign currency reserve is also included in the model as foreign currency reserve is very much related to economic condition of a country. Public debt data were obtained from the websites of the country's central bank website and Yahoo Finance databases. The GDP data as a measure of economic growth were obtained from World Bank databases. The natural logarithmic values of the variables were used in the analyses so that result can be interpreted in percentage. The data cover of 1975 to 2020.

Granger causality is one of the earliest methods developed to quantify the causal effect from time series observations. Causality testing in Granger sense is conventionally conducted by estimating VAR models. But this model still suffers of the non stationary problem. The most difficult parts of testing multi variable Granger causality are how to confirm the co-integrating relationship and how to estimate the VAR accurately when its system is integrated. If the Granger causality test is conducted at first difference

VAR framework then it will be misleading in the presence of cointegration (Engle and Granger, 1997).

To test the causality among the variables, Toda-Yamamoto test is performed. The results demonstrate the existence of short-run and long-run relationship among the variables. Toda-Yamamoto test is an alternative to conventional Granger Causality test which is based on a modified version of Granger non-Causality test. This test was first used by Toda-Yamamoto (1995) in order to overcome the shortcomings in the ordinary Granger Causality test. The conventional Granger causality test follows a standard normal distribution which means that when variables are integrated the Granger causality test becomes fragile and may not be able to generate robust results. Toda-Yamamoto test uses an augmented SVAR K+ dmax which generates asymptotic VAR statistic in the form of Chi-square distribution. K is the optimal lag length and dmax is the maximum order of integration.

According to Gujarati 1995 there are few short coming in granger causality like first one is model specification problem and number of lags. Second one drawback of this approach is spurious regression. Toda-Yamamoto is considered to be superior to the traditional granger causality because of this approach does cure of above shortcomings of traditional granger causality. For testing Toda-Yamamoto no need to bind us that our all variables must stationary at level or first difference etc. Toda-Yamamoto, granger causality test which is valid irrespective of whether a series is I(0), I(1) or I(2), non-cointegreted or co-integrated of any uniformed order. Advantage of Toda-Yamamoto is that this approach makes granger causality much easier because of in this technique researchers have no need to test cointegration or convert VAR into ECM.

### 4.1 Stationary Test

**Table 4.1: Augmented Dicky fuller Test**

| Variables | At Level | First difference |
|---|---|---|
| Real Gross Domestic Product (lrgdp) | 0.99 | 0.00 |
| Domestic Debt (ldd) | 0.642 | 0.0053 |
| Foreign Debt (lfd) | 0.00 | |
| Foreign Currency Reserve (lfcr) | 0.9055 | 0.00 |

As shown in the table: 4.1 foreign debt is stationary at level and rest of the variable are stationary at first difference.

### 4.2 Granger Causality based on Toda-Yamamoto Methodology

In order to investigate the causality among public debt and gross domestic product

and the direction of causality, the causality test proposed by Toda-Yamamoto (1995) was applied. This test is an appropriate approach to avoid some of the problems faced by the Granger causality test. For the Granger causality test to be performed, the series must be stationary or be integrated in the same order. However, it should be considered that there may also be causality between different series of integrated series. An advantage of this test is that it does not consider the cointegration information in the system. Testing can be done regardless of whether the series is co-integrated. In Toda-Yamamoto approach, the standard vector autoregressive model (VAR) is created by using the levels regardless of the order of the series. Then, the actual order of the VAR model is artificially changed to k + d max by adding the maximum integration order d max. However, the coefficients of the terms added to the model are not taken into consideration. In this causation procedure, the integration order (dmax) must not exceed the actual range (k) of the VAR model. According to the Toda-Yamamoto causality test procedure, the internal debt, external debt, foreign currency reserve and GDP model is presented as in equations as follows:

$$\ln rgdp_t = \alpha_0 + \sum_{i=1}^{k+d\max} \alpha_1 \ln rgdp_{t-i} + \sum_{i=1}^{k+d\max} \alpha_2 \ln dd_{t-i} + \sum_{i=1}^{k+d\max} \alpha_3 \ln fd_{t-i} + \sum_{i=1}^{k+d\max} \alpha_4 \ln fcr_{t-i} + \varepsilon_1$$

$$\text{h}\, \boldsymbol{d}_{\ t} = \beta_0 + \sum_{i=1}^{k+d\max} \beta_1 \text{h}\, \boldsymbol{d}_{\ t-i} + \sum_{i=1}^{k+d\max} \beta_2 \text{h}\ rgdp_{t-i} + \sum_{i=1}^{k+d\max} \beta_3 \text{h}\ \textit{fl}_{\ t-i} + \sum_{i=1}^{k+d\max} \beta_4 \text{h}\ fcr_{t-i} + \varepsilon_2$$

$$\text{h}\ \textit{fl}\ = \delta_0 + \sum_{=1}^{+\ \max} \delta_1 \text{h}\ \textit{fl}_{\ -} + \sum_{=1}^{+\ \max} \delta_2 \text{h}\ rgdp_{-} + \sum_{=1}^{+\ \max} \delta_3 \text{h}\ \boldsymbol{d}_{\ -} + \sum_{=1}^{+\ \max} \delta_4 \text{h}\ fcr_{-} + \varepsilon_3$$

$$\text{h}\ fcr_t = \eta_0 + \sum_{i=1}^{k+d\max} \eta_1 \text{h}\ fcr_{t-i} + \sum_{i=1}^{k+d\max} \eta_2 \text{h}\ rgdp_{t-i} + \sum_{i=1}^{k+d\max} \eta_3 \text{h}\ \boldsymbol{d}_{\ t-i} + \sum_{i=1}^{k+d\max} \eta_4 \text{h}\ \textit{fl}_{\ t-i} + \varepsilon_4$$

Toda Yamamoto causality test is performed with the help of modified WALD (MWALD) using above equations. In equations, $\text{h}\ rgdp_t$, $\text{h}\ \boldsymbol{d}_{\ t}$, $\text{h}\ \textit{fl}_{\ t}$ and $\text{h}\ fcr_t$ represent the variables examined. In models, each variable is regressed on each other with a number of delays from 1 to k +d max. $\varepsilon_1$, $\varepsilon_2$, $\varepsilon_3$, and $\varepsilon_4$ expresses error terms in equations. k shows the maximum number of lags and d the degree of integration of the variables.

### 4.3 Johansen Cointegration Test

It is not necessary to run Johansen cointegration for Toda-Yamamoto test. However Johansen is conducted to check robustness of model. It shows whether there is long run relationship between variables or not.

**Table 4.2: Johansen Cointegration Test**

| Unrestricted Cointegration Rank Test (Trace) | | | | |
|---|---|---|---|---|
| **Hypothesized No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Prob.**** |
| None * | 0.555647 | 68.67762 | 47.85613 | 0.0002 |
| At most 1 * | 0.402772 | 33.79878 | 29.79707 | 0.0164 |
| At most 2 | 0.231006 | 11.63414 | 15.49471 | 0.1753 |
| At most 3 | 0.007858 | 0.339233 | 3.841466 | 0.5603 |

As shown in the table, trace test indicates there are two co-integrating equations at the 0.05 level. So it can be safely concluded that there is long run relationship between the variables.

### 4.4 Lag Selection Criteria

**Table 4.3: Lag Selection Criteria**

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | -21.91076 | NA | 4.44e-05 | 1.328757 | 1.499379 | 1.389975 |
| 1 | 211.9530 | 407.7624 | 6.27e-10 | -9.843742 | -8.990633* | -9.537654 |
| 2 | 234.6458 | 34.91211* | 4.58e-10* | -10.18697 | -8.651371 | -9.636008* |
| 3 | 250.4637 | 21.09047 | 4.97e-10 | -10.17763 | -7.959543 | -9.381796 |
| 4 | 264.8521 | 16.23305 | 6.23e-10 | -10.09498 | -7.194409 | -9.054279 |
| 5 | 290.5982 | 23.76569 | 4.89e-10 | -10.59478 | -7.011726 | -9.309212 |
| 6 | 309.1367 | 13.30967 | 6.69e-10 | -10.72496 | -6.459417 | -9.194519 |
| 7 | 328.8815 | 10.12554 | 1.19e-09 | -10.91700* | -5.968971 | -9.141690 |

According to guide line, the lag which is supported by majority criteria is selected. So here two lags are selected as LR,FPE and HQ criteria suggested.

### 4.5 VAR Model Estimation

LRGDP = 0.671029622778*LRGDP(-1) - 0.165887573889*LRGDP(-2) + 0.0334628517762*LDD(-1) - 0.0456106914496*LDD(-2) - 0.050559545044*LFCR(-1) + 0.0724946821762*LFCR(-2) + 0.101677452291*LFD(-1) - 0.0880008869551*LFD(-2) + 0.0893141873848 + 0.482211074317*LRGDP(-3) + 0.0221939825768*LDD(-3) - 0.0289199902471*LFCR(-3) - 0.00396546773715*LFD(-3)

LDD = 1.41608645421*LRGDP(-1) + 0.373862643441*LRGDP(-2) + 0.946908587785*LDD(-1) - 0.647945069639*LDD(-2) - 0.142891333415*LFCR(-1)

- 0.0402642575839*LFCR(-2) + 0.351849779949*LFD(-1) + 0.252394370498*LFD(-2) - 21.4584683001 + 0.400791960843*LRGDP(-3) + 0.0214318508644*LDD(-3) - 0.0733824972605*LFCR(-3) - 0.314586752254*LFD(-3)

LFCR = - 0.258264657421*LRGDP(-1) - 0.425283545999*LRGDP(-2) - 0.447352934375*LDD(-1) + 0.716050352896*LDD(-2) + 0.640386071913*LFCR(-1) + 0.278430623932*LFCR(-2) + 0.344847259527*LFD(-1) - 0.601281623266*LFD(-2) - 1.95118110038 + 0.866743371084*LRGDP(-3) + 0.17732009459*LDD(-3) - 0.220534559987*LFCR(-3) + 0.122204701861*LFD(-3)

LFD = 0.16573273621*LRGDP(-1) - 0.180040684326*LRGDP(-2) + 0.333808174075*LDD(-1)-0.401776311494*LDD(-2)+0.0108100967843*LFCR(-1) - 0.0961792696486*LFCR(-2) + 0.853386151709*LFD(-1) + 0.515074964336*LFD(-2) - 0.196970839964 + 0.0666128211123*LRGDP(-3) + 0.194993341232*LDD(-3) + 0.0374674530271*LFCR(-3) - 0.475824256982*LFD(-3)

### 4.6 VAR Granger Causality Result

**Table 4.4: VAR Granger Causality Result**

| Independent Variables | Causality Direction | Dependent Variables | Chi-square | Probability Value |
|---|---|---|---|---|
| LDD | No causality | LRGDP | 0.769593 | 0.68 |
| LFCR | Causality | LRGDP | 6.717162 | 0.03 |
| LFD | Causality | LRGDP | 6.029886 | 0.04 |
| LRGDP | No causality | LFD | 0.046196 | 0.97 |
| LDD | No causality | LFD | 2.686889 | 0.26 |
| LFCR | No causality | LFD | 0.618116 | 0.73 |
| LRGDP | No causality | LFCR | 0.323146 | 0.85 |
| LDD | No causality | LFCR | 3.161026 | 0.20 |
| LFD | No causality | LFCR | 2.947100 | 0.22 |
| LRGDP | Causality | LDD | 5.918078 | 0.05 |
| LFCR | No causality | LDD | 3.206876 | 0.20 |
| LFD | Causality | LDD | 6.380895 | 0.04 |

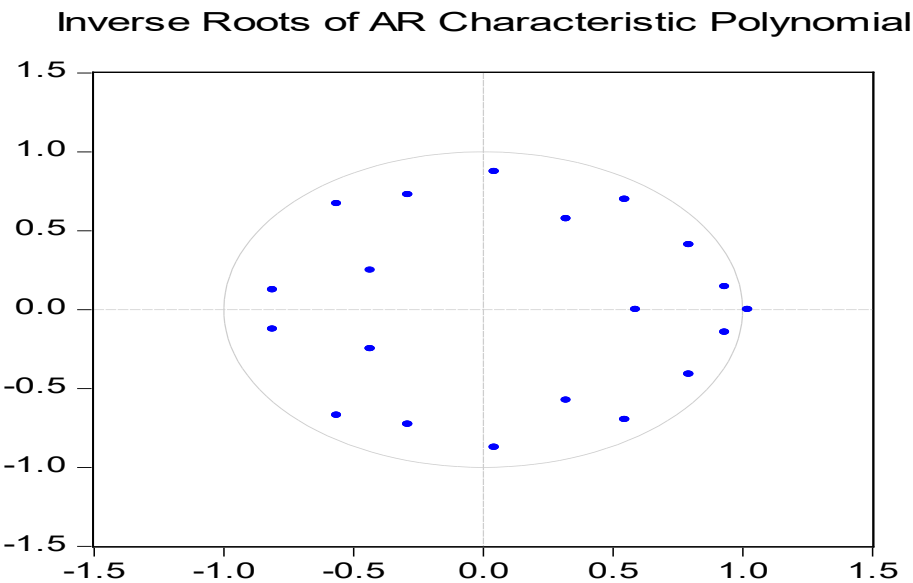
As shown in the table 4.4, the empirical results point out that one-way Granger causality running from real gross domestic product to domestic debt whereas foreign debt cannot be caused by all three variables. Similarly, foreign currency reserve also cannot be caused by all three variables. No causality between foreign currency reserve and domestic debt is found. Surprisingly internal debt cannot affect real gross domestic product. This result reveals that rather one-way Granger causality running from foreign

currency reserve and foreign debt to real gross domestic product for the mentioned time period. No unidirectional causality among the variables was found in the result.

### 4.7 Stability Test

Figure shows the stability of the parameters of the built VAR by analyzing it through the inverse roots of the characteristic AR (AutoRegressive) polynomial displayed in an Argand Diagram (or Argand Plane. According to this procedure, all of the points included in the circle determine a stable model. In this sense, all of the elaborated VAR models are considered to be almost stable.

**Figure 4.1: Estimated VAR (Vector Auto Regressive) Parameter Model Stability Analysis**




## 5. Conclusion and Recommendations

The study has investigated the nature and the direction of causality among real gross domestic product (RGDP), internal debt (DD), foreign debt (FD) and foreign currency reserve (FCR) of Nepal by using Yearly data period 1975 to 2020. A modified version of the Granger causality test proposed by Toda and Yamamoto is applied for testing the bilateral causality between the four variables. The empirical results point out that one-way Granger causality running from real gross domestic product to domestic debt whereas foreign debt cannot be caused by all three variables. Similarly, foreign currency reserve also cannot be caused by all three variables. No causality between

foreign currency reserve and domestic debt is found. Surprisingly internal debt cannot affect real gross domestic product. This result reveals that rather one-way Granger causality running from foreign currency reserve and foreign debt to real gross domestic product for the mentioned time period. No unidirectional causality among the variables is found in the result. Policymakers should take into consideration of this conclusion and should adopt more structural reforms to collection of domestic debt.

As for policy implications, projects to be financed with government borrowing should be properly appraised and their technical feasibility, financial viability and economic desirability ascertained before the funds are committed. This would help to restore financial discipline and curtail the misapplication and inefficient management of public debts. Foreign debt rather than Domestic debt will stimulate higher rate of economic growth in Nepal. This is because foreign debt is granted with certain strict criteria which are to be fulfilled as a result its productivity would get increased.

But with respect to domestic debt, perhaps it is not properly utilized. The biggest problem faced in Nepalese economy is not to spend development expenditure in time. As a result, it has hampered in the overall economic growth. Recent data shows that the government has been able to spend only 14.4 per cent of the development budget allocated for the current fiscal year as the first half of the year has completed. Similarly the government has set the annual target at Rs 1 trillion and 11.75 billion but Rs 422.23 billion has been collected as of the first half of the year. So fiscal reforms that boost domestic revenue generation by broadening the revenue base should be initiated and regular government expenditure should be limited. Likewise government should ensure that borrowed funds are productively invested in the value-added sectors for the economic growth in the long-run.

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**Annex:**

**Table 1: Vector Auto-regression Estimate**

| | LRGDP | LDD | LFCR | LFD |
|---|---|---|---|---|
| LRGDP(-1) | 0.671030 | 1.416086 | -0.258265 | 0.165733 |
| | (0.16860) | (0.83064) | (1.23662) | (0.84883) |
| | [ 3.98010] | [ 1.70482] | [-0.20885] | [ 0.19525] |
| | | | | |
| LRGDP(-2) | -0.165888 | 0.373863 | -0.425284 | -0.180041 |
| | (0.19059) | (0.93900) | (1.39795) | (0.95957) |
| | [-0.87039] | [ 0.39815] | [-0.30422] | [-0.18763] |
| | | | | |
| LDD(-1) | 0.033463 | 0.946909 | -0.447353 | 0.333808 |
| | (0.04317) | (0.21267) | (0.31661) | (0.21732) |
| | [ 0.77523] | [ 4.45257] | [-1.41296] | [ 1.53599] |
| | | | | |
| LDD(-2) | -0.045611 | -0.647945 | 0.716050 | -0.401776 |
| | (0.05647) | (0.27823) | (0.41422) | (0.28433) |
| | [-0.80766] | [-2.32881] | [ 1.72868] | [-1.41309] |
| | | | | |
| LFCR(-1) | -0.050560 | -0.142891 | 0.640386 | 0.010810 |
| | (0.02430) | (0.11974) | (0.17827) | (0.12236) |
| | [-2.08030] | [-1.19334] | [ 3.59232] | [ 0.08834] |
| | | | | |
| LFCR(-2) | 0.072495 | -0.040264 | 0.278431 | -0.096179 |
| | (0.02886) | (0.14220) | (0.21170) | (0.14531) |
| | [ 2.51177] | [-0.28316] | [ 1.31523] | [-0.66188] |
| | | | | |
| LDD(-3) | 0.022194 | 0.021432 | 0.177320 | 0.194993 |
| | (0.04810) | (0.23698) | (0.35281) | (0.24217) |
| | [ 0.46141] | [ 0.09044] | [ 0.50260] | [ 0.80518] |
| | | | | |
| LFCR(-3) | -0.028920 | -0.073382 | -0.220535 | 0.037467 |
| | (0.02382) | (0.11734) | (0.17469) | (0.11991) |
| | [-1.21428] | [-0.62539] | [-1.26244] | [ 0.31246] |
| | | | | |
| LFD(-3) | -0.003965 | -0.314587 | 0.122205 | -0.475824 |
| | (0.04227) | (0.20827) | (0.31006) | (0.21283) |
| | [-0.09381] | [-1.51051] | [ 0.39414] | [-2.23572] |