

The Relationship between Tax and Economic Growth in Nepal

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Received: July 25, 2022

Revised: August 20, 2022

Accepted: September 3, 2022

How to Cite:

Mandal, R. B. (2022). The relationship between tax and economic growth in Nepal. *Economic Review of Nepal*, 5(1), 58–71.
<https://doi.org/10.3126/ern.v5i1.66040>

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Abstract

This study examines the relation between tax and economic growth in Nepal for the period of 1992 to 2022. The study analyzes the existence of the long-run relationship between custom duty, excise duty, value added tax and micro economic indicator GDP at current price of the Nepalese economy. The study utilized time series data analysis, using annual data covering the period of 1992 to 2020 in Nepal. The empirical results of the study, using the ARDL model, highlighted the impact of different tax indicators on economic growth. Findings indicated that a long-run (but no short-run) relationship existed between tax and economic growth in Nepal. More specifically, the results show that the custom duty and value added tax has the negative impact on the economic growth in the long run. Similarly, the result excise duty shows that positive impact on the economic growth in Nepal.

Keywords: tax, economic growth, co-integration, ARDL model, Nepal

JEL Classification: H20, O43, C22, C40

Introduction

The tax is a major source of government revenue all over the world. It is a compulsory levy imposed on a subject or upon his property by the government to provide security, social facilities and create conditions for the economic well-being of the society Anyanwu (1997) and (Appah & Oyandonghan, 2011) stated that tax are imposed to regulate the production of certain goods and services, protection of infant industries, control business and curb inflation, reduce income inequalities etc. Engen and Skinner (1996) suggest that a number of recent theoretical studies have used endogenous growth models to stimulate the effects of fundamental tax reform on economic growth. All these studies conclude that reducing the distorting effects of the current tax structure would permanently increase growth. Government use tax proceeds to render their traditional functions, such as the provision of public goods, maintenance of law and order, defense against external aggression, regulation of trade and business to ensure social and economic maintenance (Azubike, 2009). Musgrave and Musgrave (2004) also stated that the economic effects of tax include micro effects on the distribution of income and efficiency of resource use as well as macro effect on the level of capacity output, employment, prices, and growth.

In Nepalese context, indirect tax is a main source of tax revenue in Nepal. it covers more than 61.47 percent of the tax revenue between 1992/93 to 2021/22 in which value added tax provides by 28.33 percent of tax revenue followed by custom duty by 19.77 percent and excise duty is 13.37 percent of tax revenue respectively. This type of tax structure generally

affects many economic activities. In a developing country like Nepal, there is a necessity for raising a large volume of resources for financing a sustained growth of public investment (Shrestha, 2000). It has been found that there is a tendency to collect taxes for the political, social and economic development of the country. Likewise, taxes are levied to control the production of goods and services, to control trade and inflation, to reduce inequality in income, etc. Poverty has reached extreme levels in Nepal, investors are hesitant to invest, inflation and income inequality have increased. Therefore, the objective of this study is to examine the impact of the tax on the economic growth.

The tax is a significant source of government revenue worldwide, and it is imposed to provide security, social facilities, and economic well-being. In the context of Nepal, indirect tax is the main source of tax revenue, and there is a need to raise resources for sustained public investment. The study aims to examine the impact of tax on economic growth in Nepal and provide valuable insights for policymakers.

This study observes the relationship between tax and economic growth in Nepal with ARDL model by using four variables, during 2002 to 2021. The main purpose of this study is to examine the impact of tax on economic growth in Nepal and the fill gap in literature and would be great for policy makers in implementing the key decision. Finally, the study has special motive to deliver active and efficient policy for future.

The paper is organized as follows: section two discussed the main literature review, section three describes the dataset and presents the empirical methodology, section four explains the results and discussion, section five diagnostic test and section six conclusion and recommendation of this study.

Limitations of the Study

There are these limitations of the current study: Data availability with respect to variables is dependence on secondary sources from 1992 to 2022. Only four number of variables used in the current study such as GDP, Custom duty, excise duty and VAT of Nepal.

Literature Review

This section reviews the theoretical concept of taxation and empirical literature, providing an overview of the topic. The empirical review of literature is related to international review of literature and national review of literature. Furthermore, the empirical literature reviews highlights the context of international and national research.

Theoretical Review of Literature

The impact of indirect taxes and economic growth is not new; there are quite a number of theories underlining the concept of taxation. The benefit theory of taxation wherein the taxes are to be imposed on individuals according to the benefit conferred on them. The more benefits a person derives from the activities of the state, the more he should pay to the government (Cooper, 1994) However, it is impossible to implement precisely due to the difficulty of determining the amount of government benefits, including diffuse benefits such as military protection received by each resident and non-resident tax payer .

The ability to pay theory of taxation (Pigou, 1920) is synonymous with the principle of equity or justice in taxation. People with higher incomes should pay more taxes than people with lower incomes. It appears more reasonable and just that taxes should be levied on

the basis of the taxable capacity of an individual. The major drawback inherent in this theory is the definition of one's ability to pay.

The Ibn Khaldun's theory on taxation as adopted by Islahi (2006) identifies two different effects: the arithmetic and the economic effect which the tax rates have on revenues. The two effects have opposite results on revenue in case the rates are increased or decreased. According to the arithmetic effect, if tax rates are lowered, tax revenues will be lowered by the amount of the decrease in the rate. The reverse is true for an increase in tax rates. The economic effect however recognized the positive impact that lower tax rate have on work, output and employment and thereby the tax rate base used in providing incentives to increase these activities whereas raising tax rates here the opposite economic effect is used by penalizing participation in the taxed activities. At a very high tax rate, negative economic effect dominates positive arithmetic effect, thereby, the tax revenue declines (Islahi, 2006).

The socio-political theory of taxation presented by Wagner (1883) states that social and political objectives should be the major factors in selecting taxes. The theory advocated that a tax system should not be designed only to serve individuals, but should be used to cure the ills of society as a whole. Wagner, in other words, was advocating a modern welfare approach in evolving and adopting a tax policy.

Review of the Empirical Literature

A significant number of researchers have investigated the relationship between tax burdens and economic growth in different countries (Baiardi et al., 2019; Neog & Gaur, 2020; Padda & Akram, 2009). The inverse relationship between the taxes and economic growth rate is due to a) high tax rate discourages work efforts and reduces the tax revenue, b) mobilizes the citizens from high tax rate countries to lower-tax countries c) marginal tax rates also distort price signals. As a result, foreign investors cannot relocate to a country with a high tax rate because they will not be able to maximize their profits (Al-tarawneh et al., 2020; Mdanat et al., 2018). In order to take advantage of the low tax rates and strong investment opportunities, local investors will begin to invest abroad. As a result, the burden of taxation and structure is crucial for economic development (Stoilova, 2017). Babatunde et al. (2017) investigated the impact of taxes on the growth of the African economy. According to the findings, the total amount of tax revenue has a positive effect on GDP and helps to encourage economic growth in Africa. Using a pooled panel of data, Stoilova (2017) studied the relationship between tax policy and economic expansion in 28 European nations. The relationship between taxation and economic growth was the main topic of this study. According to the findings of the study, certain tax rates have a beneficial effect on economic development.

Ahmad et al. (2013) empirically analyzed how much the tax impacts the economic growth of Pakistan by using ARDL model with time series data from 1976 to 2011. The result shows that economic growth is positively impacted by life expectancy, trade liberalization, and exchange rate. Larissa-Margareta et al., (2012) claim a negative correlation between taxes and government spending due to increased taxable income. According to the author's research, there is a negative correlation between corporate profits and economic development in 25 OECD nations from 1975 to 2011. Higher tax rates are bad for the

economy. On the other hand, lower tax rates are essential to the country's economic growth since they create funds that may be used to increase productivity.

Ferede and Dahlby (2012) studied ten Canadian provinces using data from 1977-2006. They found that there is a link between a country's tax rate and its economic growth. They argue that higher taxes on corporate profits limit economic growth. Economic growth can be boosted by a reduction in taxes, and the opposite is also true. Taxes influence economic growth in two ways, increases in overall factor productivity and the accumulation of factors. Investors are put off by higher tax rates, which has a negative impact on the country's economy. Taxes reduce the efficiency of resource allocation, which in turn affects the efficiency of production components. Whether or not taxes affect economic development and income distribution is a hotly debated topic. The equal distribution of income is favored by progressive taxation (Clark & Lawson, 2008). Tax policy is an essential part of any country's economic strategy. Investment suffers when taxes are raised. Bad policies hurt the economy's productivity by limiting investment in new ideas and technologies. People and organizations will devote more time and resources to research and development if the tax rate is reduced. Paying more in taxes reduces economic growth because it reduces incentives to work. (Koester & Kormendi, 1989) and (Padovano & Galli, 2001) examined that there is no significant association between taxes and economic growth. Additionally, Dowrick (1993) and Leibfritz et al. (1997) founds that taxation has a destructive impact on economic growth.

In Nepalese context, Khadka (1995) reviewed an evaluation of the Nepalese income tax system. The study concludes that the Nepal's tax system suffers from several problems. Income tax system is less revenue productive, inefficient and damaging both vertical and horizontal equities of Nepal. This statement is supported by Shrestha (2000). According to Shrestha indirect tax cannot be taken for purpose of allocation and distribution of resources fully. It means tax cannot support economic growth and development in Nepal. Acharya (2016) analyzed the tax reforms and their impacts on responsiveness in Nepal with using simple regression model. This study focused on macroeconomic data for the period 1990 to 2017. This study determined that Tax reforms have positive impacts on the structural change in the overall tax system in Nepal. Again, Acharya (2021) examined the "Impact of raising tax rates in GDP growth: the case of Nepal" by using the best fit approach and sample size of this study from 1975 to 2018 of annual time series data. This study reveals that raising taxes has positive impact on economic growth. Kharel (2021) examined the economic impact of tax revenue and economic growth of Nepal, from 2000 to 2018 time series data with using linear regression model. The study concludes that tax revenue has a positive and significant effect on GDP of Nepal.

Research Gap

This study discusses the relationship between taxation and economic growth, specifically in Nepal. While, only a few studies have explored the relationship between Taxation and economic growth in Nepal. Furthermore, some researchers have presented differing findings, a thorough examination is still lacking, and there is no consensus on the true nature of this relationship. Therefore, this study comes to analyze the relationship between Taxation and economic growth in Nepal.

Data and Method

Research Design, Study Period, and Source of Data

The study used quantitative and deductive method using annual time series data of selected variables such as GDP at current price, Custom duty, Excise duty, and value added tax for 30 years from 1992 to 2022. The required data and information were collected from Ministry of Finance, Government of Nepal.

Tools and Method

The study used Augmented Dickey-Fuller (ADF) approach, autoregressive distributed lag (ARDL) model, unit root tests, bound test, co-integration test, error correction model, diagnostic test using CUSUM and CUSUMSQ test.

Mode Specification

The model for examining the relation between tax and the economic growth is adopted from the work of Omoniyi and Omobitan (2011). To achieve the study aims, this study employed the following econometrics model based on the different time series literature on the tax and economic growth. To analyze the relation between tax and the economic growth, such the following model is used:

$$GDP = f(\text{Cust}, \text{Exc}, \text{VAT}) \text{ ----- (1)}$$

For the above equation (1), the econometric model can be written as:

$$GDP_t = \alpha_0 + \beta_1 \text{Cust}_t + \beta_2 \text{Exc}_t + \beta_3 \text{VAT}_t + \varepsilon_t \text{ ----- (2)}$$

Where, GDP = Gross Domestic Product at current price; Cust = Custom duty; Exc = excise duty; VAT = Value Added Tax, β = Coefficient of variables and ε = Error term.

This study has applied autoregressive distributed lag (ARDL) bound testing approach popularized by Pesaran and Shin (1995). This model offers several advantages. First, the ARDL bound testing approach does not involve pretesting variables, which means that the test for the existence of relationships between variables are applicable irrespective of whether the underlying regressors are purely I(0), purely I(1) or mixture of both. However, none of the variables should be I(2). Second, while conventional co-integration methods estimate the long-run relationship within the context of a system of equations, the ARDL method employs only a single reduced form equation (Pesaran & Shin, 1995). Third, the ARDL technique generally provides unbiased estimates of the long-run model and valid t-statistics, even when some of the regressors are endogenous (Odhiambo, 2011). Fourth, while other co-integration techniques are sensitive to the size of the sample, the ARDL test is suitable even when the sample size is small. Thus, the ARDL test has superior small sample properties compared to the co-integration test (Pesaran & Shin, 1995). Consequently, the approach is considered very suitable for analyzing the relationship and it has been increasingly used in empirical research by ARDL model.

Following model is estimated to apply ARDL bound test approach,

$$\Delta GDP_t = \alpha_0 + \sum_{t=i}^p \beta_1 \Delta GDP_{t-i} + \sum_{t=i}^p \beta_2 \Delta Cust_{t-i} + \sum_{t=i}^p \beta_3 \Delta Exc_{t-i} + \sum_{t=i}^p \beta_4 \Delta VAT_{t-i} + \delta_1 GDP_{t-1} + \delta_2 Cust_{t-1} + \delta_3 Exc_{t-1} + \delta_4 VAT_{t-1} + \varepsilon_t \text{ ----- (3)}$$

The bounds test is mainly based on the joint F-statistic which its asymptotic distribution is non-standard under the null hypothesis of no co-integration. The first step in the ARDL bounds approach is to estimate by ordinary least squares (OLS). The estimation

(3); $\beta_1, \beta_2, \beta_3,$ and β_4 represent short-run dynamic and $\delta_1, \delta_2, \delta_3$ and δ_4 represent the long-run relationship. The null hypothesis of long-run relationship is $\delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$. The calculated F-statistic is compared with critical value tabulated by Pesaran et al., (2001). If the calculated F-statistic value comes more than upper bound values I (1), assuming that all the variables in the ARDL model are I(1). Meaning that there is co-integration among the underlying variables. In other hand, If the calculated F-statistic value comes less than lower bound values I (0), assuming that all the variables in the ARDL model are I (0). Meaning that there is no co-integration among the underlying variables. For each application, there is a band covering all the possible classifications of the variables into I (0) and I (1).

The null and alternate hypothesis to test are given below,

$$H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0 \text{ and } H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$$

The null hypothesis (H_0) of no co-integration is rejected when the value of the test statistic exceeds the upper critical bounds value, while it is accepted if the F-statistic is lower than the lower bounds value. After measuring the existence of long run relationship among variables then choosing optimal lag length by using of Akaike Information (AIC) or standard criteria such as Swartz Bayesian (SBC). Prediction of long run and short run coefficient is done afterwards. ARDL long run method is shown as follows:

$$GDP_t = \alpha_0 + \sum_{t=i}^p \beta_1 GDP_{t-i} + \sum_{t=i}^p \beta_2 Cust_{t-i} + \sum_{t=i}^p \beta_3 Exc_{t-i} + \sum_{t=i}^p \beta_4 VAT_{t-i} + \varepsilon_t \text{ ----- (4)}$$

An unrestricted Error Correction Model (ECM) is used to find short run estimation of model. So the equation is identified and given below,

$$GDP_t = \alpha_0 + \sum_{t=i}^p \beta_1 \Delta GDP_{t-i} + \sum_{t=i}^p \beta_2 \Delta Cust_{t-i} + \sum_{t=i}^p \beta_3 \Delta Exc_{t-i} + \sum_{t=i}^p \beta_4 \Delta VAT_{t-i} + \lambda ECT_{t-1} \text{ --} \\ \text{----- (5)}$$

Where, ECT_{t-1} = Error Correction Model and λ measure speed of adjustments.

To determine the goodness of fit of the ARDL model, diagnostic and stability tests are conducted. The diagnostic test examines the auto correlation, serial correlation, normality, and heteroscedasticity associated with the model. The structural stability test is conducted by employing the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ).

Results and Discussion

This section presents the empirical parts of the study; where the data related to Nepal will be analyzed by conducting the necessary econometrics tests through time series co-integration Analysis. Firstly, presents the descriptive analysis and test the stationarity of each variable using time series unit root tests with ADF and PP approach, then to examine the long run and short run relationship between the study variables with proper method of estimation.

Descriptive Analysis

Table 1 presents the descriptive analysis of GDP, Cust, Exc, and VAT during the observation period from 1992/93 to 202/22, including minimum, maximum, mean, and standard deviation statistics.

Table 1*Descriptive Statistics of GDP Per Capita Growth in Nepal*

	LnGDP	LnCust	LnExc	LnVAT
Mean	11.426	7.911	7.174	8.138
Median	11.252	7.537	6.930	7.934
Maximum	13.092	10.093	9.722	10.355
Minimum	9.750	5.978	4.979	5.993
Std. Dev.	1.051	1.186	1.650	1.354
Skewness	0.080	0.316	0.17	0.172
Kurtosis	1.658	1.878	1.593	1.665
Jarque-Bera	2.284	2.072	2.615	2.377
Probability	0.319	0.355	0.271	0.305

Note. Computed by authors using E-views 11, based on GoN, MOF data.

The highest mean is in GDP with 11.426, followed by VAT, Cust and Exc with 8.138, 7.911 and 7.174 respectively. Similarly, the highest standard deviation is in Exc, and the least standard deviation is in GDP over the observation period. With regard to the normality of the series, the descriptive statistics show that the all variables are normally distributed (probability of the Jarque-Bera statistic > 5%). So we say study data are normally distributed.

Unit Root Test

Before applying ARDL approach to co-integration, unit roots of all the series are tested. The application of ARDL bound testing approach requires that none of the variables are integrated of order 2 (Pesaran et al., 2001). Therefore, first it is necessary to confirm the order of integration for each variable. For this purpose, this study uses Augmented Dickey-Fuller (ADF) test proposed by Dickey and Fuller (1979) and Phillips Perron (PP) test proposed by Phillips and Perron (1988). The use of only I(1) variables with the ARDL approach is a common and well-supported practice in econometric analysis.

By focusing on variables that are integrated of order one, researchers can accurately estimate long-run relationships and avoid the pitfalls of spurious regression. The concept of co-integration plays a crucial role in justifying this approach, as it highlights the stable long-run equilibrium relationships that exist among non-stationary variables. Valid literature, such as the work of Pesaran et al. (1999), Pesaran et al. (2001), Nkoro et al (2016), Bhoosal et al. (2022) further reinforces the effectiveness and reliability of using only I(1) variables with ARDL. Ultimately, this approach allows researchers to obtain robust estimates of co-integrating relationships and enhance the accuracy of their econometric analysis.

Table 2*Results of Unit Root Test*

Variables	ADF Test (Intercept)		ADF Test (Trend & Intercept)		Conclusion
	I(0)	I(1)	I(0)	I(1)	
LNGDP	-2.9677 (0.9293)	-2.9718 (0.0066)	-3.5806 (0.5490)	-3.5806 (0.0239)	I(1)
LnCust	-2.9678 (0.9823)	-2.9719 (0.0003)	-3.5742 (0.8636)	-3.5806 (0.0010)	I(1)
LnExc	-2.9678 (0.9840)	-2.9719 (0.0001)	-3.5742 (0.3626)	-3.5806 (0.0003)	I(1)
LnVAT	-2.9678 (0.9553)	-2.9719 (0.0006)	-3.5742 (0.7475)	-3.5806 (0.0032)	I(1)

Variables	PP Test (Intercept)		PP Test (Trend and Intercept)		Conclusion
	I(0)	I(1)	I(0)	I(1)	
LNGDP	-2.9678 (0.9270)	-2.9719 (0.0066)	-3.5742 (0.7293)	-3.5806 (0.0239)	I(1)
LnCust	-2.9678 (0.9939)	-2.9719 (0.0002)	-3.5742 (0.8665)	-3.5806 (0.0000)	I(1)
LnExc	-2.9678 (0.9867)	-2.9719 (0.0000)	-3.5742 (0.3941)	-3.5806 (0.0003)	I(1)
LnVAT	-2.9678 (0.9582)	-2.9719 (0.0006)	-3.5742 (0.7244)	-3.5806 (0.0002)	I(1)

Note. Computed by authors using E-views 11, based on GoN, MOF data.

Table 2 presented the ADF and PP unit root test results by including intercept only and by including both trend and intercept, which results of ADF and PP at level and at first difference. According to results of both the tests, in GDP, Cust, Exc and VAT are stationary at first difference at 1 percent significance level according to ADF test and at 1 percent significance level according to PP test. In this situation we can apply ARDL approach to co-integration.

Co-integration and ARDL Model Results

This section examines the long-run relationship between the variables in the general ARDL model using the bounds testing procedure. In this process, the first step is to obtain the appropriate lag order on the first differenced variables in Equations (1) by using the AIC and the SIC. The optimal lag selection criteria are employed to reduce residual correlation. Specifically, the lag length is determined using vector autoregressive (VAR) models based on Akaike Information Criteria (AIC), Hannan-Quinn Information Criteria (HQ), and Schwartz Information Criteria (SC). The rule of thumb is to select the criteria that have the lowest value. Because the lower the value, the better the model.

Table 3*Lag Order Selection*

Lag	LogL	LR	FPF	AIC	SIC	HQ
0	30.7385	NA	1.74e-06	-1.9099	-1.7196	-1.8517
1	147.2833	191.4665*	1.34e-09*	-9.0917*	-8.1401*	-8.8008*
2	157.8931	14.3990	2.14e-09	-8.7067	-6.9938	-8.1830

Note. Computed by authors using E-views 11, based on GoN, MOF data. *indicate lag order selected by the criteria; LR: sequential modified LR test statistics (each test at 5% level); FPE: Final prediction error; AIC = Akaike information criteria, SIC: Schwarz information criteria and HQ: Hannan-Quinn information criteria.

The results for appropriate lag order selection are reported in table 3. The lag selection using both information criteria produce the same results for the ARDL model. The optimal lag length selected for the ARDL model with no serial correlation is 1. Before estimating the coefficients for long-run and short-run relationship, it is necessary to confirm the existence of long-run relationship among the variables under consideration. Therefore, in the second step, this study uses ARDL bounds test to confirm the existence of co-integration relationship among variables under study. The ARDL bounds F-test result shown in table 4.

Following the estimation of the ARDL model and the use of AIC or SIC for optimal lag-length selection, the AIC-based ARDL (1, 0, 0, 0) model was selected because it is more parsimonious than the SIC-based model.

Table 4*Bound F-Statistics for Testing the Existence of Long-Run Relationship*

Test statistics	Value	Significance	I(0)	I(1)
				Asymptotic: n=1000
F-statistic	7.4282	10%	2.72	3.77
k	3	5%	3.23	4.35
		1%	4.29	5.61
t-statistic	-5.7816	10%	-2.57	-3.46
		5%	-2.86	-3.78
		1%	-3.43	-4.37

Source: Computed by authors using E-views 11, based on GoN, MOF data.

Table 4 shows that the F-statistic for ARDL bounds test is 7.4282, which is greater than upper bound critical value at 5 percent level (3.23, 4.35). It implies that there is sufficient evidence to reject the null of no co-integration. The t-statistic also support their long-run relationship because absolute value of t-statistics is higher than I (1). Thus, the results of the ARDL bounds F-test suggest that there exists a long-run relationship between GDP at current price, Custom duty, Excise duty, value added tax in Nepal during the study period. It shows that those variables tend to balance over the long-run move together over the long-run. However, this result should be considered preliminary, and simply indicates that there is long-run relationship among variables under investigation. Hence, ARDL model can be applied to estimate the long-run and short-run coefficients. After confirming the existence of long-run relationship, the next is to estimate the long-run and short-run coefficients of the selected ARDL model.

Table 5*Results of ARDL (1, 0, 0, 0) Model*

Variables	Coefficient	Std. Error	t-Statistic	P-Values
lnCust	-0.342946	0.200692	-1.708819	0.1000
lnExc	0.525268	0.221080	2.376371	0.0258
lnVAT	-0.462641	0.272296	-1.699041	0.1022

Note. Computed by authors using E-views 11, based on GoN, MOF data.

Table 5 reveals that the coefficient of custom duty (CD), and value added Tax (VAT) are negative and CD is statistically weak significant at 10 percent level implying the existence of a negative long-run impact on GDP in Nepal and VAT is statistically insignificant at 5 percent and 10 percent level. The coefficient (-0.343946) of CD indicates that one unit increase in Cust value decrease by 0.34 unit; coefficient (-0.46264) of VAT shows that one unit increase in VAT value decrease by 0.46264 unit but it is statistically insignificant at 5 percent and 10 percent level. Similarly, the coefficient of Exc is 0.525268 which indicates that one unit increase the Exc the value of GDP increase by 0.525 unit in the long run in Nepal. The long-run results related to the influence of other variables show the mixed results.

Table 6*Error Correction Representation of the Selected ARDL (1, 0, 0, 0) Model, Dependent Variable GDP.*

Variables	Coefficient	Std. Error	t-Statistic	P-Values
C	2.149135	0.351841	6.108249	0.0000
CointEq(-1)*	-0.313061	0.054148	-5.781614	0.0000

$R^2 = 0.5531$; Adj. $R^2 = 0.5366$; F-Statistic = 33.4270; Prob (F-stat) = 0.0000; DW = 1.813295.

Note. Computed by authors using E-views 11, based on GoN, MOF data.

Table 6 contains the results of error correction representation of the selected ARDL model. Coefficients of the variables show the short-run elasticities but there is not short run relationship among the variables on the GDP. The coefficient of error correction term (-0.313061) is significant at 1 percent level. Highly significant negative sign of the error correction term reinforces the existence of long-run relationship among the variables. However, the speed of adjustment from previous year's disequilibrium in GDP to current year's equilibrium is only 0.313061units.

Diagnostic Tests

Diagnostic tests were also applied to check the adequacy of the model specifications. The results of diagnostic test of the ARDL (1, 0, 0, 0, 0) model are reported in Table 6.

Table 6*ARDL (1, 0, 0, 0, 0) Model Diagnostic Test*

Diagnostic Test	F-statistic	Obs* R-squared
Serial Correlation	Prob. F(1,23) = 0.6676	Prob. Chi-Square (1) = 0.6266
Heteroscedasticity	Prob. F(4,24) = 0.7347	Prob. Chi-Square (4) = 0.6920
Normality	Jarque-Bera = 5.831328	Probability = 0.0542

Note. Computed by authors using E-views 11, based on GoN, MOF data.

The results of diagnostic tests suggest that long run and short-run estimates are free from serial correlation, heteroscedasticity of the model, and non-normality of the error term. The Jarque-Bera F-statistic value is 5.83 with a P-value of 0.0542, indicating non-normality of the error term as it exceeds 5 percent. This finding is supported with the studies by Kunwar (2019), Alwis et al. (2021), and Ghasemi et al. (2012).

CUSUM and CUSUMSQ Tests

The cumulative sum (CUSUM) of recursive residuals and the CUSUM of square (CUSUMSQ) tests are applied to assess the parameter stability (Pesaran & Pesaran, 1997). Therefore, the stability of the ARDL parameters was tested by applying the CUSUM and CUSUMSQ tests developed by Brown et al., (1975) figure 2 and 3 show plots of the cumulative sum of recursive residuals and cumulative sum of squares of recursive residuals, respectively.

Figure 2

CUSUM Test

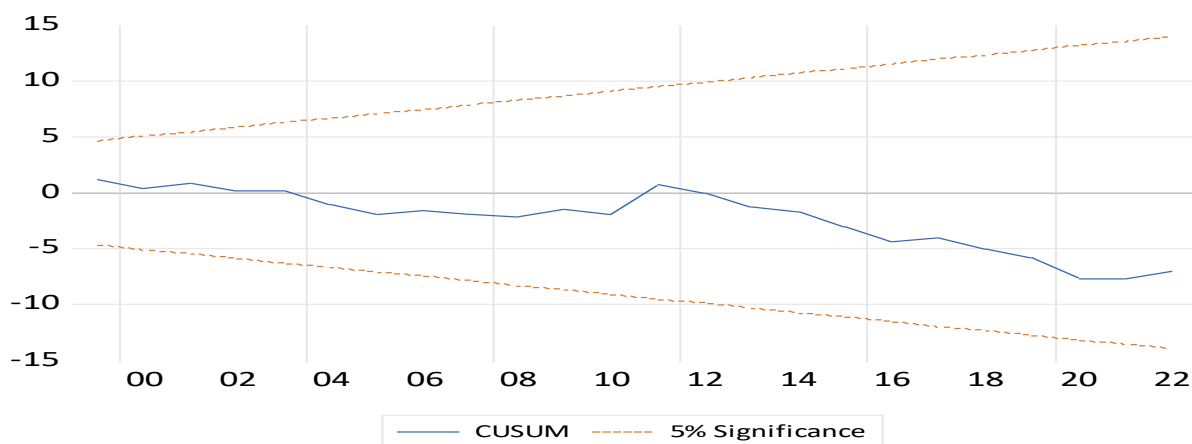
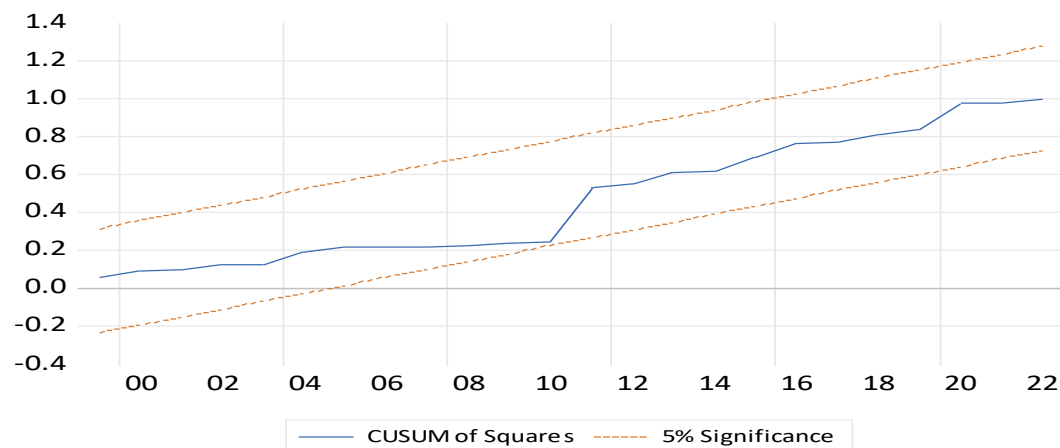


Figure 3

CUSUM Square Test



Note. Computed by authors using E-views 11, based on GoN, MOF data.

These results show that the ARDL parameters are stable because graphs of the CUSUM and CUSUMSQ are within the critical bounds at the 5 per cent level of significance. Thus, the model is stable and it confirms the stability of the long-run coefficients of the repressors.

Discussion and Conclusions

This study employed ARDL model to examine the impact of tax on economic growth in Nepal. The analyzed variables are related to Nepal, which is time series data during 1993 to 2022. The empirical study presents the descriptive analysis, unit root tests with ADF and PP approach, lag order selection, bound test and the examine the long run and short run relationship between the study variables. At last, diagnostic tests were also applied to check the acceptability of the model specifications.

The empirical study show that coefficient of Custom duty have and VAT are negative and Cust is statistically significant at 10 percent level implying the existence of a negative long-run impact on GDP in Nepal. Similarly, coefficient of VAT have negative impact on economic growth in Nepal with insignificant in level furthermore, *Exc* has positive impact on economic growth in the long run; it is significance at 1 percent level and the coefficient the variable shows that there is not short run relationship among the variables on the GDP.

The results suggest that taxation is partially statically significance both in long and short term. It shows contradiction result. Therefore, the government should control the revenue leakages, modernize the tax systems, enhance taxpayer convenience, minimize tax errors, and improve collection efficiency in order to achieve higher economic growth in Nepal.

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