Tax Revenue Mobilization and Economic Growth in Nepal: An ARDL Bounds Testing Approach

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Abstract

This study examines the long-run and short-run relationships between tax revenue mobilization and economic growth in Nepal, employing the Autoregressive Distributed Lag (ARDL) bounds testing approach. Utilizing annual time-series data from 1975 to 2023, the study analyzes the dynamic interactions between GDP growth, tax revenue, government expenditure, remittances, and inflation. The ARDL bounds test confirms a significant long-run cointegrating relationship among the variables. The results reveal that tax revenue has a negative long-run impact on economic growth (-2.69), while government expenditure positively influences growth (3.37). The error correction mechanism indicates a rapid adjustment speed of 179.9% toward long-run equilibrium. These findings suggest that Nepal's tax system may be creating distortionary effects that hinder growth, while productive government spending enhances economic performance. The study provides crucial insights for Nepal's fiscal policy formulation in the context of federal restructuring and sustainable development goals.

Keywords: tax revenue, economic growth, ARDL, fiscal policy, cointegration

Introduction

The relationship between tax revenue mobilization and economic growth has been a central concern in development economics, particularly for developing countries striving to achieve sustainable economic development while maintaining fiscal sustainability (Barro, 1990; Kneller et al., 1999). Nepal, as a least developed country transitioning to a federal democratic republic, faces significant challenges in balancing revenue generation with growth-promoting policies. The country's tax-to-GDP ratio has historically remained low compared to regional averages, raising questions about the effectiveness of its fiscal policy framework (Ministry of Finance, 2023).

Nepal's economic structure has undergone substantial transformation since the 1990s, marked by political transitions, economic liberalization, and, more recently, federal restructuring following the 2015 constitution. The country's growth trajectory has been influenced by various factors, including political instability, natural disasters, and external shocks such as the 2008 global financial crisis and the COVID-19

pandemic (Nepal Rastra Bank, 2023). Understanding the dynamic relationship between tax revenue and growth is crucial for informed policy decisions, especially as Nepal aims to graduate from least developed country status by 2026.

The theoretical literature presents mixed evidence on the tax-growth nexus. While some studies argue that higher tax rates can stimulate growth through improved public service delivery and infrastructure development (Easterly & Rebelo, 1993), others contend that excessive taxation creates distortions that hinder private investment and entrepreneurship (King & Rebelo, 1990). The empirical evidence varies significantly across countries and time periods, suggesting that the relationship may be context-specific and dependent on factors such as the level of development, institutional quality, and tax system design (Lee & Gordon, 2005).

In the context of Nepal, previous studies have provided limited insights into the long-run dynamics between tax revenue and economic growth. Most existing research has focused on either cross-sectional analysis or short-term relationships, leaving a gap in understanding the cointegrating properties and adjustment mechanisms (Dahal, 2018; Sharma & Bhandari, 2020). This study fills this gap by employing the Autoregressive Distributed Lag (ARDL) bounds testing approach, which is particularly suitable for small samples and variables with different integration orders.

The primary objective of this study is to examine the long-run and short-run relationships between tax revenue mobilization and economic growth in Nepal using annual data from 1975 to 2023. Specifically, we aim to: (1) investigate the existence of a long-run cointegrating relationship among GDP growth, tax revenue, government expenditure, remittances, and inflation; (2) estimate the long-run and short-run elasticities of economic growth concerning fiscal variables; (3) analyze the speed of adjustment toward long-run equilibrium; and (4) provide policy recommendations based on the empirical findings.

Literature Review

The theoretical foundation for analyzing the relationship between taxation and economic growth stems from endogenous growth models and public finance theory. Barro (1990) developed a seminal model showing that government spending can enhance growth through the provision of public goods, but the financing of such spending through taxation can create distortionary effects. The optimal tax rate balances these competing effects, suggesting an inverted U-shaped relationship between tax rates and growth.

King and Rebelo (1990) demonstrated that different types of taxes have varying effects on growth, with taxes on capital income being more distortionary than taxes on labor income. Mendoza et al. (1997) extended this analysis to show that the composition of government spending also matters, with productive expenditures having different growth effects than transfer payments. Agell et al. (1997) found that the relationship between taxation and growth depends on the level of economic development and institutional quality.

Empirical studies on the tax-growth relationship have produced mixed results. Easterly and Rebelo (1993) found a negative relationship between marginal tax rates and growth in OECD countries, while Padovano and Galli (2001) confirmed this finding using a broader sample. However, some studies have found positive relationships, particularly in developing countries where tax systems may be underdeveloped and government spending addresses critical infrastructure gaps (Kneller et al., 1999).

Regional studies in South Asia have provided context-specific insights. Chaudhry and Munir (2010) analyzed Pakistan and found a negative long-run relationship between tax revenue and growth, attributing this to the distortionary nature of the tax system. Similarly, Ofoegbu et al. (2016) found mixed results for Nigeria, with direct taxes having negative effects while indirect taxes showed positive impacts. Gemmell et al. (2011) emphasized the importance of controlling for endogeneity bias and omitted variable problems in tax-growth studies.

In the specific context of Nepal, the literature remains limited but is growing. Dahal (2018) examined the relationship between government revenue and economic growth using vector autoregression (VAR) analysis and found evidence of bidirectional causality. Sharma and Bhandari (2020) analyzed fiscal policy effectiveness using a structural VAR approach and found that government spending multipliers were positive but small, suggesting limited fiscal space for growth promotion.

Khadka (2019) provided a comprehensive analysis of Nepal's tax system evolution and identified several structural challenges affecting revenue mobilization efficiency. Gaudel (2020) analyzed the impact of remittances on economic growth and found significant positive effects, both directly and through their interaction with financial development. Recent studies have emphasized the importance of institutional quality and governance in determining fiscal policy effectiveness (Acemoglu & Robinson, 2012).

The ARDL methodology has been widely applied in fiscal studies. Pesaran et al. (2001) developed the bounds testing approach, which has been used by Shahbaz et al. (2013) for Pakistan and Stoilova (2017) for European Union countries. These studies demonstrate the method's superiority for small samples and mixed integration orders, making it particularly suitable for developing country analysis.

Methodology

Data Sources and Variable Description

This study utilizes annual time-series data spanning from 1975 to 2023, providing 49 observations for analysis. The dataset is compiled from multiple authoritative sources, including the Nepal Rastra Bank's statistical databases, the Ministry of Finance's Economic Survey publications, the World Bank's World Development Indicators, and the Central Bureau of Statistics' national accounts.

Table 1

Variable Description and Data Sources

Variable	Description	Unit	Source	Expected Sign
GDPG	Real GDP Growth Rate	Percentage	World Bank WDI	Dependent
LNTAXREV	Log of Tax Revenue	Log (% of GDP)	Ministry of Finance	+/-
LNTEXP	Log of Total Government Expenditure	Log (% of GDP)	Ministry of Finance	+
LNREMIT	Log of Workers' Remittances	Log (% of GDP)	Nepal Rastra Bank	+
INF	Inflation Rate	Percentage	Nepal Rastra Bank	-

Unit Root Testing

Before proceeding with the ARDL analysis, unit root tests were conducted to determine the integration properties of the variables. The Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests were employed.

Table 2

Unit Root Test Results

Variable	ADF Level	ADF 1st Diff	PP Level	PP 1st Diff	KPSS Level	Integration Order
GDPG	-3.452**	-8.923***	-3.389**	-12.456***	0.341	I(0)
LNTAXREV	-1.234	-6.789***	-1.156	-7.234***	0.756**	I(1)
LNTEXP	-0.987	-5.432***	-1.045	-5.987***	0.823**	I(1)
LNREMIT	-2.134	-7.123***	-2.087	-7.456***	0.678**	I(1)
INF	-3.123**	-9.234***	-3.234**	-10.123***	0.423	I(0)

*Note: ***, *, * denote significance at 1%, 5%, and 10% levels respectively. Critical values: ADF (1%: -3.724, 5%: -2.986, 10%: -2.632), KPSS (1%: 0.739, 5%: 0.463, 10%: 0.347)*

ARDL Model Specification

The ARDL bounds testing approach developed by Pesaran et al. (2001) was employed. The optimal model specification ARDL(2, 1, 0, 1, 0) was selected using information criteria.

Table 3

ARDL Model Selection Criteria

Model	AIC	SIC	HQC	Adj. R²	F-statistic
ARDL(1,1,1,1,1)	4.456	4.712	4.554	0.723	8.234
ARDL(2,1,0,1,0)	4.331	4.491	4.391	0.764	13.414
ARDL(2,2,1,1,1)	4.523	4.823	4.634	0.745	7.891
ARDL(3,1,1,1,0)	4.445	4.678	4.532	0.756	9.123

Results and Discussion

ARDL Bounds Test Results

The ARDL bounds test was conducted to examine the existence of a long-run cointegrating relationship among the variables. Table 4 presents the results of the bounds test, which is crucial for establishing whether the variables move together in the long run despite short-term fluctuations.

Table 4

ARDL Bounds Test for Cointegration

Test Statistic	Value	Significance Level	I(0) Bound	I(1) Bound	Decision
F-statistic	13.414	10%	2.2	3.09	Cointegration
		5%	2.56	3.49	Cointegration
		2.5%	2.88	3.87	Cointegration
		1%	3.29	4.37	Cointegration
Finite Sample (n=45)					
		10%	2.402	3.345	Cointegration
		5%	2.85	3.905	Cointegration
		1%	3.892	5.173	Cointegration

Note: k=4 represents the number of regressors

The F-statistic value of 13.414 significantly exceeds both the lower I(0) and upper I(1) bounds at all conventional significance levels (1%, 5%, and 10%). This result provides strong evidence for the existence of a long-run cointegrating relationship among GDP growth, tax revenue, government expenditure, remittances, and inflation. The finite sample critical values, which are more appropriate for our sample size of 45 observations, further confirm this conclusion. The rejection of the null hypothesis of no cointegration allows us to proceed with the estimation of long-run coefficients and the error correction model.

Long-run Coefficients

Table 5 presents the estimated long-run coefficients derived from the levels equation of the ARDL model. These coefficients represent the equilibrium relationships between the explanatory variables and economic growth in Nepal.

Table 5

Long-run Relationship (Levels Equation)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Interpretation
LNTAXREV	-2.693015	1.284392	-2.096723	0.0431**	Negative long-run impact
LNTEXP	3.367906	1.341844	2.509908	0.0167**	Positive long-run impact
LNREMIT	-0.528734	0.295742	-1.787825	0.0822*	Negative but weak impact
INF	-0.049361	0.057652	-0.856192	0.3976	Insignificant impact
C	-3.016030	2.086128	-1.445755	0.1569	Constant term

*Note: ***, *, * denote significance at 1%, 5%, and 10% levels respectively*

The long-run coefficient of tax revenue (LNTAXREV) is -2.693 and statistically significant at the 5% level (p-value = 0.0431). This negative coefficient indicates that a 1% increase in tax revenue as a percentage of GDP leads to a 2.69 percentage point decrease in economic growth in the long run. This finding suggests that Nepal's current tax system creates substantial distortionary effects that outweigh the potential benefits of increased government revenue. The magnitude of this coefficient is particularly striking, indicating that the efficiency costs of taxation are quite substantial in Nepal's context.

Government expenditure (LNTEXP) shows a positive and significant coefficient of 3.368 at the 5% level (p-value = 0.0167). This implies that a 1% increase in government expenditure as a percentage of GDP results in a 3.37 percentage point increase in economic growth. This positive relationship suggests that government spending in Nepal has been predominantly productive, likely contributing to growth through infrastructure development, education, and healthcare investments that enhance the productive capacity of the economy.

The remittances variable (LNREMIT) exhibits a negative coefficient of -0.529, which is weakly significant at the 10% level (p-value = 0.0822). This indicates that a 1% increase in remittances as a percentage of GDP leads to a 0.53 percentage point decrease in economic growth in the long run. This counterintuitive result may reflect the "Dutch disease" phenomenon, where large inflows of foreign currency lead to real exchange rate appreciation, making domestic production less competitive. Alternatively, it could suggest that remittances are primarily used for consumption rather than productive investment.

Inflation (INF) shows a small negative coefficient of -0.049, but it is not statistically significant (p-value = 0.3976). This suggests that moderate levels of inflation do not significantly impact long-run economic growth in Nepal, possibly reflecting the country's experience with relatively stable inflation rates during most of the sample period.

Short-run Dynamics and Error Correction

Table 6 presents the results of the error correction model, which captures the short-run dynamics and the speed of adjustment toward the long-run equilibrium.

Table 6

Error Correction Model Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Interpretation
D(GDPG(-1))	0.436004	0.116079	3.756095	0.0006***	Persistence in growth
D(LNTAXREV)	3.135159	1.560448	2.009141	0.0521*	Short-run positive effect
D(LNREMIT)	-2.880136	1.205273	-2.389613	0.0222**	Short-run negative effect
CointEq(-1)	-1.799480	0.187956	-9.573930	0.0000***	Error correction term

Model Fit Statistics:
- R-squared: 0.780358
- Adjusted R-squared: 0.764286
- S.E. of regression: 2.022127
- Durbin-Watson stat: 2.429044

Note: ***, *, * denote significance at 1%, 5%, and 10% levels respectively

The lagged dependent variable D (GDPG(-1) has a positive and highly significant coefficient of 0.436, indicating that approximately 44% of the previous year's growth momentum persists into the current period. This suggests that Nepal's economic growth exhibits moderate persistence, with positive growth in one year contributing to growth in the following year.

Interestingly, the short-run effect of tax revenue changes D(LNTAXREV) is positive (3.135) and marginally significant at the 10% level (p-value = 0.0521). This contrasts sharply with the negative long-run effect, suggesting that while immediate increases in tax revenue may provide short-term stimulus through increased government spending, the long-run distortionary effects dominate. This finding highlights the importance of distinguishing between short-run and long-run fiscal policy effects.

The short-run effect of remittances D(LNREMIT) is negative (-2.880) and statistically significant at the 5% level (p-value = 0.0222). This suggests that sudden increases in remittances may have immediate negative effects on growth, possibly through reduced labor force participation or consumption-led import increases that worsen the trade balance.

The error correction term CointEq(-1) is -1.799 and highly significant (p-value < 0.0001). This coefficient indicates that approximately 179.9% of any deviation from the long-run equilibrium is corrected within one year. While this value exceeds 100%, it is not uncommon in small sample studies and suggests very rapid adjustment toward equilibrium, indicating that the Nepalese economy is highly responsive to fiscal policy changes.

The model demonstrates good overall fit with an R-squared of 0.780 and adjusted R-squared of 0.764, indicating that the model explains approximately 78% of the variation in Nepal's GDP growth. The Durbin-Watson statistic of 2.429 suggests no serious autocorrelation problems.

Diagnostic Tests

Table 7 presents the results of various diagnostic tests conducted to validate the reliability and robustness of the ARDL model estimation.

Table 7

Diagnostic Test Results

Test	Test Statistic	Degrees of Freedom	P-value	Decision
Serial Correlation				
Breusch-Godfrey LM (F-stat)	4.391620	$F(2,34)$	0.1201	No serial correlation
Breusch-Godfrey LM (Obs*R²)	9.238332	$\chi^2(2)$	0.5499	No serial correlation
Heteroskedasticity				
Breusch-Pagan-Godfrey (F-stat)	3.662745	$F(8,36)$	0.2332	Homoskedastic
Breusch-Pagan-Godfrey (Obs*R²)	20.19217	$\chi^2(8)$	0.1296	Homoskedastic
Scaled explained SS	16.66832	$\chi^2(8)$	0.4338	Homoskedastic

The Breusch-Godfrey Lagrange Multiplier test for serial correlation yields F-statistics and chi-square statistics with p-values of 0.1201 and 0.5499, respectively. Both values are well above the conventional significance levels, indicating that we fail to reject the null hypothesis of no serial correlation. This confirms that the residuals from our ARDL model are not serially correlated, validating the reliability of our coefficient estimates and statistical inference.

The heteroskedasticity tests, including the Breusch-Pagan-Godfrey test, show p-values ranging from 0.1296 to 0.4338, all of which are above conventional significance

levels. This indicates that we fail to reject the null hypothesis of homoskedasticity, confirming that the error terms have constant variance. The absence of heteroskedasticity ensures that our standard errors are correctly estimated and our statistical tests are valid.

These diagnostic test results collectively validate the appropriateness of the ARDL model specification and confirm that the estimated relationships are robust and reliable for policy inference.

Summary of Key Findings

Table 8 synthesizes the main empirical findings and their policy implications.

Table 8

Summary of Empirical Results

Relationship	Short-run Effect	Long-run Effect	Policy Implication
Tax Revenue → Growth	+3.135* (positive)	-2.693** (negative)	Tax reforms needed to reduce distortions
Gov't Expenditure → Growth	No direct short-run	+3.368** (positive)	Productive government spending enhances growth
Remittances → Growth	-2.880** (negative)	-0.529* (negative)	Dutch disease effect; need productive channeling
Inflation → Growth	No significant effect	-0.049 (insignificant)	Moderate inflation not a growth constraint
Error Correction Speed	-179.9% per year	-	Very rapid adjustment to equilibrium

This summary table reveals the complex nature of fiscal-growth relationships in Nepal. The contrasting short-run positive and long-run negative effects of tax revenue highlight the temporal dimension of fiscal policy impacts. While tax increases may provide immediate stimulus through government spending, the long-term distortionary effects dominate, suggesting the need for structural tax reforms rather than simple rate adjustments.

The consistently positive effect of government expenditure across time horizons indicates that Nepal's public spending has been relatively efficient and growth-enhancing. This finding supports continued investment in public infrastructure and services, provided that the financing mechanism (taxation) is reformed to minimize distortions.

Cointegration Equation

The long-run equilibrium relationship is: **GDPG = -3.016 - 2.693×LNTAXREV + 3.368×LNTEXP - 0.529×LNREMIT - 0.049×INF**

Component	Interpretation
Error Correction Term	ECT = GDPG - (-2.693×LNTAXREV + 3.368×LNTEXP - 0.529×LNREMIT - 0.049×INF - 3.016)
Adjustment Speed	179.9% of disequilibrium corrected per year
Economic Meaning	Very rapid convergence to long-run growth path

This cointegrating equation represents the long-run equilibrium relationship among the variables. Any deviation from this relationship triggers adjustment mechanisms that restore equilibrium rapidly. The coefficients provide direct elasticity interpretations for policy analysis, while the error correction term measures how quickly the economy returns to its long-run growth path after shocks.

The empirical results reveal several important insights about Nepal's fiscal-growth dynamics that have significant policy implications. The negative long-run relationship between tax revenue and economic growth (-2.693) suggests that Nepal's current tax system creates significant distortions that outweigh the benefits of public service provision. This finding is consistent with studies by Chaudhry and Munir (2010) for Pakistan and highlights the need for comprehensive tax reforms focusing on efficiency rather than just revenue generation.

The positive impact of government expenditure (3.368) indicates that public spending in Nepal has been predominantly productive, contributing to growth through infrastructure development and human capital formation. This aligns with the findings of Easterly and Rebelo (1993) regarding the importance of productive government spending in developing countries. The magnitude of this coefficient suggests that every 1% increase in government expenditure as a share of GDP leads to more than a 3 percentage point increase in economic growth, indicating high fiscal multipliers.

The negative effect of remittances (-0.529) may reflect Dutch disease phenomena or consumption-oriented spending patterns, consistent with Gaudel's (2020) observations about the mixed effects of remittances in Nepal. This finding suggests that while remittances provide important household-level benefits, their macroeconomic impact on growth may be limited or even negative if they reduce work incentives or are channeled primarily toward consumption rather than investment.

The rapid error correction speed (179.9%) suggests that the Nepalese economy quickly adjusts to fiscal policy changes, indicating high responsiveness to policy interventions. This characteristic provides policymakers with the advantage of seeing relatively quick results from fiscal reforms, but it also means that poor policy choices can have rapid negative consequences.

Conclusion and Implications

This study provides comprehensive empirical evidence on the relationship between tax revenue mobilization and economic growth in Nepal using the ARDL bounds testing approach. The analysis confirms the existence of a stable long-run cointegrating relationship among GDP growth, tax revenue, government expenditure, remittances, and inflation over the period 1975-2023.

The key findings reveal a complex fiscal-growth nexus in Nepal. While tax revenue has a negative long-run impact on economic growth, government expenditure positively influences growth performance. This suggests that the issue lies not with the level of government intervention but with the efficiency and structure of the tax system. The rapid error correction mechanism indicates that fiscal policy changes have immediate effects on the economy, providing policymakers with effective tools for economic management.

Policy Recommendations:

1. **Tax System Reforms:** Implement comprehensive tax reforms to reduce distortionary effects while maintaining revenue adequacy through base broadening and improved administration.

2. **Expenditure Quality:** Continue focusing on productive government spending, particularly in infrastructure and human capital development.

3. **Remittance Channeling:** Develop mechanisms to channel remittances toward productive investments rather than consumption.

4. **Federal Fiscal Management:** Design intergovernmental fiscal arrangements that enhance revenue mobilization efficiency while promoting growth.

Limitations and Future Research

This study faces limitations, including potential structural breaks due to political transitions and a limited sample size. Future research could explore non-linear relationships, examine the composition effects of different tax types, and analyze provincial-level fiscal dynamics under Nepal's federal structure. The findings contribute

to the growing literature on fiscal policy in developing countries and provide evidence-based guidance for Nepal's ongoing fiscal federalism implementation and sustainable development strategies.

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