MACRO ECONOMIC DETERMINANTS OF TAX REVENUE IN NEPAL

A Thesis

Submitted to the Department of Economics, Patan Multiple Campus,
Faculty of Humanities and Social Sciences, Tribhuvan University, Nepal,
in partial fulfillment of requirements of the Degree of

MASTER OF ARTS
in
ECONOMICS

By

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July,2024

DECLARATION

I hereby declare that the thesis entitled, "MACROECONOMIC DETERMINANTS OF TAX REVENUE IN NEPAL" which I have submitted to the Department of Economics, Patan Multiple Campus, in partial fulfillment of the requirements for the Degree of MASTER OF ARTS in ECONOMICS,is entirely my original work prepared under the guidance of my supervisor.I have made due acknowledgements to all ideas and information borrowed from different sources in the course of writing this thesis. The result of this thesis have not been presented or submitted anywhere else for award of any degree. I shall be solely responsible if any evidence is found against my declaration.

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Sarita Neupane

LETTER OF RECOMMENDATION

This thesis entitled “MACROECONOMIC DETERMINANTS OF TAX REVENUE IN NEPAL” has been prepared by Ms. SARITA NEUPANE under my guidance and supervision. I, hereby,recommend it in partial fulfillment of the requirements for the Degree of MASTER OF ARTS in ECONOMICS for final examination.

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LETTER OF APPROVAL

We certify that this thesis entitled "MACROECONOMIC DETERMINANTS OF TAX REVENUE IN NEPAL" submitted by SARITA NEUPANE to the Department of Economics, Faculty of Humanities and Social Sciences, Patan Multiple Campus, Tribhuvan University, in partial fulfillment of the requirements for the Degree of MASTER OF ARTS in ECONOMICS has been found satisfactory in scope and quality. Therefore, we accept this thesis as a part of the said degree.

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ACKNOWLEDGEMENT

First and foremost, I would like to express my deep gratitude to my thesis supervisor, Pujan Adhikari, whose unwavering support has been instrumental in the preparation of this thesis. His guidance and constructive feedback have greatly contributed to shaping this report and expanding my knowledge.

I would also like to extend my sincere gratitude to Associate Professor Raghu Bir Bista, Head of the Department of Economics, at the Faculty of Humanities and Social Sciences, Patan Multiple Campus.

I am indebted to the discussions with various individuals throughout the course of my study. I am thankful for the insightful comments, discussions, and motivating words from all my professors. Special thanks to Prof. Madhav Dahal and Bishnu Prasad Sharma for their inspirational guidance.

Furthermore, I wish to express my gratitude to my colleague Sanjoj Maharjan for his support on IT-related tasks and software. I am also thankful to my friends Ragni, Prayush, Bina, and Prajjwol for their invaluable support and insights during the preparation of this report. Their cooperation was essential in completing this work.

Lastly, I am deeply grateful to my family. My parents, with their endless encouragement and belief in my abilities, my husband, a constant source of strength and to my daughter, "Aabha," whose presence fills my life with joy and purpose.

ABSTRACT

Financing public expenditures requires substantial resources. Tax revenues are pivotal due to their regular and mandatory nature, serving as a critical instrument for revenue generation and resource mobilization. Nepal has committed to achieving Sustainable Development Goal 17.1 by 2030, aiming to increase tax revenue to 30 percent of GDP and finance 80 percent of government expenditure through internal revenue. Therefore, enhancing a country's tax revenue performance has become imperative. The objective of this study is first to analyze the trends and structure of tax revenue (TR), foreign trade (Trade), service sector's GDP (GDP), per capita income (PCI), and foreign aid (FA), and secondly, to examine the effect of these variables on tax revenue. The coefficients of these variables were estimated using the Autoregressive Distributed Lag (ARDL) model using time series data for the period from 1975 to 2021. The study identified that per capita GDP and foreign trade are positive and significant determinants of tax revenue in the long run, whereas foreign aid and service sector's GDP lacks statistical significance. In the short run, Trade, per capita GDP, and foreign aid exhibit a positive and significant relationship with tax revenue. Relying heavily on foreign trade taxes poses challenges to government fiscal stability and economic growth due to revenue volatility from international trade fluctuations. Achieving a balanced approach between foreign trade taxes and import substitution policies is essential for sustainable economic development and resilience against fiscal shocks.

ACRONYMS AND ABBREVIATIONS

AIC	:	Akaike info criterion
ARDL	:	Autoregressive Distributed Lag
EBA	:	Extreme-Bound Analysis
ECM	:	Error Correction Model
FDI	:	Foreign Direct Investment
FEM	:	Fixed Effect Model
FGLS	:	Feasible Generalized Least Squares
GDP	:	Gross Domestic Product
GMM	:	Generalized Method of Moments
GoN	:	Government of Nepal
IMF	:	International Monetary Fund
KPSS	:	Kwiatowski-Phillips-Schmidt-Shin
LDC	:	Least Developed Country
MoF	:	Ministry of Finance
NRB	:	Nepal Rastra Bank
NTIS	:	Nepal's Trade Integration Strategy
OECD	:	Organization for Economic Co-operation and Development
OLS	:	Ordinary Least Square
PCI	:	Per Capita Income
SADC	:	Southern African Development Community
SDGs	:	Sustainable Development Goals
SGDP	:	Service Sector GDP
VAT	:	Value Added Tax
WTO	:	World Trade Organization

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CHAPTER I
INTRODUCTION

1.1 Background of the Study

Tax revenue is the primary source of income for governments. It funds public goods and services such as infrastructure, education, healthcare, and defense. It enables governments to formulate budgets, allocating funds to various sectors based on economic priorities and societal needs. Taxation influences fiscal policy, guiding government decisions on taxation and spending to achieve economic objectives such as economic growth, price stability, and full employment. Tax policies are intricately linked to fiscal policy, influencing economic activity through various mechanisms. Firstly, tax rates and structures directly impact consumer behavior and business decisions. Lower income taxes can stimulate consumer spending and increase disposable income, thereby boosting economic growth. Conversely, higher taxes on luxury goods or specific industries can alter consumption patterns and market dynamics.

Taxation supports social objectives by redistributing wealth and promoting equity. Progressive tax systems, where higher-income individuals pay proportionally more taxes, aim to reduce income inequality. Revenue generated from taxes can fund social welfare programs such as unemployment benefits, healthcare subsidies, and education grants, supporting vulnerable populations and fostering social equity. In fiscal management, taxes play a pivotal role in stabilizing the economy. During economic downturns, governments may reduce taxes or provide tax incentives to stimulate demand and investment, aiming to mitigate recessionary pressures and promote recovery. Conversely, in periods of inflation or overheating, tax increases can help manage aggregate demand and prevent excessive price rises. Governments can adjust tax rates to stimulate or slow down economic activity, using tax cuts during economic downturns to boost consumer spending and investment, or raising taxes during periods of high inflation to control demand (Debrun & Kapoor, 2010).

Tax policies can influence investment decisions and entrepreneurship. Lower corporate tax rates, for instance, can incentivize businesses to invest in capital expansion, research and development, and job creation, stimulating economic growth. Targeted tax

incentives, deductions, or credits play a crucial role in steering economic behavior towards desired outcomes. Governments often use these measures to encourage investments in specific sectors such as agriculture, renewable energy, technology, or infrastructure development. By providing financial incentives, governments aim to spur growth in priority areas, enhance competitiveness, and address societal challenges like environmental sustainability or digital transformation.

Tax revenue affects government budget deficits and the accumulation of public debt. If tax revenue falls short of government spending, it can lead to budget deficits, requiring governments to borrow to finance expenditures. Persistent deficits can result in a growing public debt burden, which may pose risks to long-term fiscal sustainability and economic stability specially in case of low/lower-middle-income countries so they need to enhance their revenue-generating capacity to ensure better sustainability of their debt (Small et al. 2020). Governments may need to adjust tax policies or control spending to manage deficits and debt levels effectively. Tax policies can impact a country's competitiveness in the global economy. High corporate tax rates, for example, may discourage foreign investment and lead to capital flight, as businesses seek jurisdictions with more favorable tax environments (Abdioğlu et al., 2016).

Taxation theories have evolved over time, reflecting changes in economic thought and policy priorities. Classical theories of taxation, originating in the 18th and 19th centuries, emphasized minimal government intervention and advocated for a simple tax system with low rates. Scholars like Adam Smith argued that taxes should be levied based on the ability to pay, and that taxes should be broad-based and equitable across society.

Neoclassical theories of taxation emerged in the late 19th and early 20th centuries, building upon classical principles while incorporating new insights from marginal analysis and welfare economics. Neoclassical economists such as Alfred Marshall focused on the efficiency of tax systems, emphasizing the importance of minimizing distortions and deadweight losses while maximizing social welfare. They advocated for broad-based taxes with low rates and minimal administrative burden.

Keynesian theory of taxation, developed by John Maynard Keynes during the Great Depression, diverged from classical and neoclassical views by emphasizing the role of

fiscal policy in managing aggregate demand and stabilizing the economy. Keynes argued that during periods of economic downturn, governments should increase spending and cut taxes to stimulate demand and spur economic growth. Taxation, in the Keynesian framework, becomes a tool for achieving macroeconomic objectives such as full employment and price stability.

Modern theories of taxation incorporate insights from behavioral economics, public choice theory, and social welfare analysis. These theories recognize the complexity of tax systems and the diverse objectives they aim to achieve, including revenue generation, income redistribution, and economic stabilization.

There are various principles and perspectives that guide the design and implementation of tax systems. The benefit theory suggests that taxes should be based on the benefits individuals receive from government expenditures, linking tax payments directly to the use of public services. Anility to pay theory emphasizes taxing individuals according to their financial capacity, advocating progressive taxation to ensure higher-income earners contribute a larger share of their income. Horizontal Equity seeks to treat individuals in similar economic situations equally, regardless of other personal characteristics. Optimal Taxation Theory explores the balance between efficiency and equity in tax systems, aiming to minimize economic distortions while promoting fairness in tax burdens.

The Laffer Curve illustrates the relationship between tax rates and revenue, suggesting an optimal point beyond which higher tax rates may reduce overall revenue due to disincentives. Tax incidence theory analyzes how taxes burden individuals, whether through direct payment or indirect effects on prices, wages, or economic behavior. Public choice theory applies economic principles to political decision making in taxation, examining how various interest groups influence tax policies. Lastly, the dynamic effects of taxation consider long term impacts on economic behavior, investment decisions, and economic growth, highlighting the broader implications of tax policies beyond immediate revenue generation. These theories collectively provide a comprehensive framework for policymakers to build tax systems that balance revenue needs with economic efficiency, equity, and societal welfare considerations.

Taxation can be broadly categorized into direct and indirect taxes, each serving distinct

purposes in fiscal policy and economic management. Direct taxes are levied directly on individuals or entities and are typically based on their income, profits, or wealth. Examples include personal income tax, corporate tax, and wealth tax. These taxes are considered progressive because they often have higher rates for higher income or profit brackets, aiming to redistribute wealth and promote social equity. Direct taxes also influence investment decisions and entrepreneurial activities, as they directly impact disposable income and business profitability. On the other hand, indirect taxes are imposed on goods and services rather than on income or profits. These include taxes like sales tax, value-added tax (VAT), excise duties, and customs duties. Indirect taxes are often regressive because they apply uniformly regardless of income level, meaning they can have a proportionally greater impact on lower-income households. However, they are essential revenue sources for governments and can be adjusted to influence consumption patterns and economic behavior. For instance, higher taxes on luxury goods or environmentally harmful products can discourage their consumption while generating revenue for public expenditures.

Both direct and indirect taxes play critical roles in government revenue generation and economic policy. Direct taxes contribute to income redistribution and social welfare programs, while indirect taxes fund government operations and can be used strategically to achieve economic goals such as price stability and economic growth. Balancing the mix of direct and indirect taxes is crucial for governments in achieving fiscal sustainability, promoting economic development, and addressing societal needs effectively.

After democracy was established in 1951, Nepal's tax system went through major changes. Originally, it only included customs duties, excise duties, and land revenue under the Rana regime. Later reforms aimed to make tax procedures more uniform and modern. This led to the introduction of key laws such as the Excise Act of 2002, the Customs Act of 2007, and the Income Tax Act of 2002, which replaced earlier legislation. Today, Nepal's major taxes encompass VAT, income tax, customs duties, and excise duties (IRD, 2016).

Taxable capacity of a government is measured by the predicted tax-to-GDP ratio estimated by taking various macroeconomic, demographic and institutional variables of a country. Tax effort is defined as an index of the ratio between the share of the actual

tax collection in GDP and the taxable capacity. In Nepal, tax-to-GDP ratio had remained below 10 percent until FY 2005/06. It was 5 percent in FY 1974/75 and 9 percent in FY 2005/06, only 4 percent point increment during three decades. Increment in tax to GDP ratio is commendable after FY 2007/08. It was 10 percent in FY 2007/08 and reached to 20 percent in FY 2020/21 with average annual increment of 1 percent point. The rise in tax-to-GDP ratio is attributable to significant rise in imports fueled by substantial growth in remittances, tax administration reform for reducing tax evasion (Akitoby et al., 2020).

Table 1.1:
Tax to GDP Ratio

Year	1974-75	1984-85	1994-95	2004-05	2014-15	2020-21
GDP (NPR million)	16,601	46,587	219,175	589,412	2,423,639	4,352,550
Tax Revenue (NPR million)	842	3,151	19,660	54,105	355,956	870,107
Tax to GDP Ratio	5%	7%	9%	9%	15%	20%

Source: Calculations using annexure I data.

Several factors influence tax revenue, among which the GDP growth rate emerges as a crucial determinant (Tsaurai, 2021; Hamdan and Rana, 2021). The relationship between Gross Domestic Product (GDP) and tax revenue is fundamental to fiscal policy analysis. GDP influences tax revenue through several key mechanisms. Firstly, as GDP grows, so do incomes and corporate profits, leading to higher revenue from income and corporate taxes. Secondly, increased economic activity typically boosts consumer spending, resulting in higher receipts from consumption taxes like sales taxes and value-added taxes (VAT). Thirdly, expanding GDP encourages greater business activity, which in turn increases revenues from taxes on profits, property, and capital gains. Moreover, economic growth tends to create more jobs and increase wages, thereby augmenting revenue from payroll taxes. Additionally, rising asset prices during GDP expansions contribute to higher revenues from taxes on capital gains and property. Robust economic expansion typically leads to higher tax revenue due to increased incomes, consumption, and business activities (Drummond et al., 2012).

Trade openness, which refers to a country's degree of integration into the global

economy through imports and exports, also plays a crucial role. Foreign trade significantly impacts tax revenue in countries through various mechanisms Addison and Levin, 2012; Zarra-Nezhad et al., 2016). Governments levy customs duties on imported goods, which constitute a substantial source of income. Changes in tariff rates and import volumes directly influence revenue collection. Value Added Tax (VAT) and sales taxes applied to imported goods further contribute to government income. Moreover, increased trade activity stimulates economic growth and consumption, leading to higher overall tax revenues.

In budget-constrained countries like Nepal, foreign aid plays a significant role in the economy and is expected to correlate positively with tax revenue performance. The relationship between foreign aid and tax revenue is complex and influenced by various factors. Foreign aid, which aims to support economic development and humanitarian efforts in recipient countries, can impact tax revenue in several ways. Aid often targets sectors like infrastructure, healthcare, and education to boost economic growth and productivity. This growth can increase government revenue from taxes on income, consumption, and profits. Aid packages also often include reforms to improve governance and tax administration, which can help countries collect taxes more effectively and broaden their tax base over time. However, relying too much on aid may reduce incentives for governments to develop their own revenue sources, potentially leading to long-term dependency. Additionally, the conditions and political influence tied to aid can affect how tax policies are shaped and implemented in recipient countries. Therefore, while foreign aid can stimulate development and strengthen tax systems, careful management is needed to ensure sustainable fiscal practices and economic independence. Concessional loans are often associated with increased domestic revenue mobilization, while grants exhibit the opposite trend. Furthermore, in nations affected by significant corruption, the decrease in revenues can entirely offset the increase in grant funding (Gupta et al., 2003).

Moreover, Per capita income significantly influences the amount of tax revenue governments collect (Ahmad et al., 2016; Ayenew, 2016). When per capita income is higher, individuals tend to earn more, leading to increased tax revenues from income taxes. Progressive tax systems, which impose higher tax rates on higher incomes, further contribute to this increase. Moreover, higher per capita income usually translates

into greater consumer spending on goods and services, generating more revenue from consumption related taxes such as sales tax or VAT.

Furthermore, government policies can significantly influence tax revenue generation, with tax rates and structures (Ade et al. 2018). Adjustments in these policies can either encourage investment and compliance or discourage economic activity, thereby affecting revenue streams from income, consumption, and corporate taxes. Economic conditions such as unemployment rates and inflation levels are critical determinants of consumer spending and business profitability. High unemployment rates can lead to reduced consumer spending, impacting revenue from VAT and other consumption-related taxes. Conversely, inflation can erode consumer purchasing power, affecting overall consumption and thereby tax revenues (Ayenew 2016); Tsaurai 2021).

Demographic factors such as population growth and aging demographics can alter the taxpayer base and impact revenue trends over time. Population growth and aging demographics can alter the taxpayer base, influencing revenue trends over time. A growing workforce may expand the income tax base, while an aging population might shift consumption patterns and impact indirect tax revenues. Moreover, technological advancements and globalization have transformed business operations and income sources, presenting new challenges and opportunities for tax administration. The digital economy, for instance, poses challenges in monitoring and taxing online transactions, necessitating innovative approaches to ensure compliance and revenue collection.

Political decisions and public attitudes towards taxation are equally critical. Public perception of tax fairness and efficiency can influence compliance levels. Effective enforcement measures and administration are crucial for maintaining high compliance rates and preventing tax evasion. Political stability and transparency in tax policies are essential for fostering an environment conducive to economic growth while ensuring sustainable revenue collection.

In conclusion, understanding these complex macroeconomic factors are essential for policymakers aiming to optimize tax revenue collection. This study explores the macroeconomic factors influencing tax revenue in Nepal.

1.2 Statement of the Problem

In developing countries, substantial resources are needed to finance expenditures. Tax revenues play a major role in domestic resource generation, given their recurring and mandatory nature. Consequently, taxation has become a crucial instrument for revenue generation and resource mobilization.

Nepal is committed to achieving the Sustainable Development Goals (SDGs), particularly through enhancing tax revenue and mobilizing domestic resources. The objective is to increase domestic revenue and finance a substantial portion of government expenditure internally (NPC, 2018). However, Nepal faces significant challenges such as tax evasion, weak enforcement mechanisms, and a large informal economy (Raut et al., 2014). These issues hinder effective mobilization of domestic resources, threatening Nepal's ability to fund essential public services, promote sustainable development, and meet its development commitments.

Furthermore, Nepal's heavy reliance on tax revenue from foreign trade, along with ongoing deficit budgeting, presents a substantial challenge to its fiscal stability. The widening disparity between revenue and expenditure raises concerns about the country's susceptibility to external economic shocks, threats to maintaining manageable levels of debt, and its capacity to uphold sustainable fiscal practices over the long term. It is crucial to address the expanding budget deficit by enhancing the revenue framework.

Various factors influence revenue collection, including GDP per capita, foreign trade, foreign aid etc. Addison and Levin (2012), Castro and Camarillo (2014) highlighted the effect of foreign trade Piancastelli and Thirlwall (2019), Ahmad et al. (2016), NRB (2017) has highlighted influence of GDP on tax revenue. Achieving the fiscal targets demands a comprehensive understanding of how these macroeconomic factors interact and affect tax revenue trends. Addressing these gaps is crucial for developing targeted policies that enhance fiscal stability, optimize revenue collection, and support sustainable development goals.

The interconnection between macroeconomic variables and tax revenue remains underexplored in the context of Nepal, highlighting a significant research gap. This study aims to delve into these macroeconomic interactions comprehensively, to

understand the relationships between economic variables and tax revenue in Nepal. Understanding these factors is crucial for developing effective policies that promote fiscal stability and sustainable development.

1.3 Research Questions

This study will provide empirical evidence on the effect of macro-economic variables under the study on tax revenue by answering following research questions:

a) What are the trends of macro-economic variables related to the tax revenue?

b) What is the effect of macro-economic variables on tax revenue of Nepal?

1.4 Objectives of the Study

The main objective of this study is to examine the determinants of tax revenue collection in Nepal. But specific objectives of this research study are as follows:

a) To analyze the trend of macro-economic variables related to the tax revenue.

b) To examine the effect of macro- economic variables on tax revenue of Nepal.

1.5 Hypothesis

To achieve the aforementioned objective, the study will be developing all of the following research hypotheses. These hypotheses were developed based on related previous empirical studies conducted in different countries concerning the issue under investigation.

H1: Per capita GDP has positive relation with the tax revenue

H2: Service sector's GDP has positive relation with the tax revenue

H3: There is significant positive relationship between tax revenue and foreign trade.

H4: Foreign assistance have positive effects on tax revenue.

1.6 Significance of the study

Understanding the determinants of tax revenue in Nepal holds significant importance for several compelling reasons. Taxation stands as a vital tool in the government's fiscal instrument, crucial for mobilizing resources and fostering public capital formation. In countries like Nepal, where financial resources are limited and there exists a significant

gap between public spending demands and the government's investment capacity, the efficient mobilization of tax revenue becomes even more critical.

Studying the factors that effects tax revenue offers valuable insights into Nepal's ability to sustain fiscal stability and adaptability. By identifying the key drivers of revenue generation, policymakers can address structural weaknesses and vulnerabilities, thereby enhancing the country's ability to withstand economic shocks and achieve long-term fiscal stability. Understanding of the factors influencing tax revenue as per capita GDP, sectoral contributions to GDP, trade dynamics, foreign aid can inform policymakers on how to optimize revenue collection strategies. This understanding is crucial for designing tax policies that are both effective in generating revenue and supportive of broader economic development objectives.

Additionally, this study aims to expand the knowledge base by examining how various macroeconomic variables interact with and affect tax revenue in Nepal. By identifying these relationships, the findings will not only inform current policymakers but also provide a foundation for future research and scholarship in similar contexts. This research will contribute to a deeper understanding of tax revenue generation in developing economies like Nepal. The findings of this study helpful to the future researchers and scholars to study similar of related issues with this study.

1.7 Limitation of the study

This study is limited in its scope as it concentrates solely on analyzing the relationship between tax revenue and specific macroeconomic variables such as Service sector’s GDP, per capita GDP, Foreign Trade and Foreign Aid. The detailed examination of tax policies and administrative efficiency. Tax rates, incentives for investment and compliance, the effectiveness of enforcement mechanisms, and the overall administrative capacity are widely recognized as significant factors influencing revenue generation in any economy. However, due to limitations in data availability or the scope of the study, these aspects were not included in the analysis.

A more comprehensive analysis would require incorporating data on tax policy measures and administrative practices, allowing for a deeper understanding of how these elements interact with macroeconomic variables to shape revenue outcomes. As a result, the study may not fully capture the complex dynamics influencing tax revenue

generation.

1.8 Outline of the study

The structure of this thesis is outlined as follows: The first chapter serves as a general introduction to the study, providing an overview of the background, objectives, and limitation of the research. The second chapter conducts a comprehensive literature review on macroeconomic determinants of tax revenue. Following this, the third chapter details the research methodology, including information on data management and the selected methodological approach for the thesis. Chapter four presents the analysis and interpretation of the results obtained. Finally, the last chapter summarizes the study, highlights major findings, and conclusion.

CHAPTER II
REVIEW OF LITERATURE

2.1 Introduction

In this chapter, attempts have been made to review the literature related to determinants of tax revenue. The main objective for this chapter is to review the theories and findings of study previously conducted in the similar and related topics. The review of literature is classified into three parts namely review of international literature and review of national literature and followed by research gap.

2.2 International context

Addison and Levin (2012) conducted an empirical study on determinants of tax revenue in sub- Saharan Africa (SSA) by using a dataset which includes an unbalanced panel data of 39 SSA countries over a time period covering the years from 1980 to 2005. The study focused on effect of share of agriculture in GDP, sum of imports and exports to GDP, per capita GDP, population size, degree of urbanization in a country and two dummy variables conflict and introduction of VAT on dependent variable namely tax to GDP, trade-tax to GDP, indirect tax to GDP and direct tax to GDP using two step GMM regression. The result showed that there is negative significant effect of share of agriculture in GDP on total tax to GDP, indirect tax to GDP and direct tax to GDP; openness has positive significant effect on total tax to GDP and trade tax to GDP; per capita GDP is positively related with total tax to revenue but not significantly and significantly negative relation with trade taxes; there is not any significant relation of urbanization with all types of taxes to GDP; foreign aid is significant and negatively related with direct tax; the effect of peace on tax revenue is positive and significant and adoption of VAT has significant impact on all tax revenue except trade taxes.

Muibi and Sinbo (2013) examined the determinants of tax revenue in Nigeria using time series data over the period from 1970 to 2011. Dynamic autoregressive distributed lag model is used to analyses the impact on tax to GDP ratio by taking five macro-economic variables namely GDP, openness, Official exchange rate, inflation rate and ratio of external debt to GDP. The main finding of the empirical analysis is that tax revenue tends be significantly responsive to changes in income level, exchange rate and inflation rate. Economic growth rate is positively related

with tax revenue whereas exchange rate depreciation and inflation have adverse effect. Openness and tax revenue are positive but not significant and concludes that macroeconomic instability and level of economic activities are the main drivers of tax buoyancy and tax effort in Nigeria.

Castro and Camarillo (2014) evaluated the determinants of tax revenue in Organization for Economic Co-operation and Development (OECD) Countries. Data of 34 OECD countries for the period from 2001 to 2011 are used to analyses the impact of economic structural and social factors on tax revenue. The study uses GDP per capita, trade volume as percentage of GDP, FDI relative to gross capital formation as economic factor, similarly agriculture value added as percentage of GDP and industrial value added as percentage of GDP as structural factor and gross tertiary school enrollment, life expectancy and Child mortality rate as social factors that determines the tax revenue. Analyses was done using the generalized method of moments (GMM). The empirical finding shows that GDP per capita, the industrial sector, and civil liberties have positive impact, while the agricultural sector and the share of foreign direct investment in gross fixed capital formation have negative impact on tax revenue.

Ahmad et al. (2016) studied the socio-economic factors influencing tax revenue in Pakistan. The study employs the Auto Regressive Distributed Lag (ARDL) model using time series data from 1975 to 2012 to estimate both long-run and short-run empirical coefficients. the tax-to-GDP ratio serves as the dependent variable, with narrow tax base, economic activity, tax compliance, informal economy, and government regime as explanatory variables. Study found that, per capita GDP and tax compliance as the positive and statistically significant factors influencing tax revenue. Conversely, the informal economy and narrow tax base negatively impact tax revenue significantly.

Ayenew (2016) investigated the determinants of tax revenue in Ethiopia. In order to empirically examine the major determinants of tax revenue, using the data for the period from 1975 to 2013. The study uses inflation, agriculture value added share of GDP, industrial value-added share of GDP and real GDP per capita income, education and foreign aid as independent variables on tax revenue percentage of GDP. Johansen maximum likelihood co-integration approach was used to estimate the short run and long run effect of independent variables. The study found that, in the long run real GDP per capita income, foreign aid and industrial value-added share of GDP positively and

significantly affect tax revenue. However, inflation exerted a negative and significant influence. Whereas, in the short run Real GDP per capita income and inflation have negative effect, whereas industrial Value-added share of GDP has positive effect on tax revenue in Ethiopia

Zarra-Nezhad et al. (2016) explored the impact of trade liberalization on tax revenue and other determinants of tax revenue across 83 countries from 1990 to 2012. Study utilized generalized method of moment regression for analysis of effect of GDP growth rate, share of agriculture in GDP, official exchange rate, urbanization, and democracy on tax revenue. The study found that increased trade liberalization was associated with higher tax revenue. share of agriculture in GDP official exchange rate urbanization have significant negative relationship with tax revenue. more democratic political regime was positively correlated with tax revenue Overall, the study underscores the importance of trade liberalization and democratic governance in enhancing tax revenue, while highlighting challenges related to agricultural taxation and currency depreciation.

Amoh and Adom (2017) examined the determinants of tax revenue growth in Ghana using ARDL model. The analysis focuses on several key variables: Foreign Direct Investment (FDI) as a percentage of GDP, Manufacturing Value Added, Services Value Added, External Debt Stocks as a percentage of Gross National Income (GNI), and Government Consumption Expenditure as a percentage of GDP. Findings reveal that estimated tax revenues consistently exceed actual figures, resulting in an annual average tax revenue gap of 10.27 percent of GDP. Significant determinants positively influencing tax revenue growth include FDI, manufacturing, services value added, and productive use of external debt proceeds, whereas non-productive government expenditure negatively impacts revenue growth. The study underscores the importance of policy reforms aimed at streamlining tax systems to mitigate adverse effects on revenue generation, crucial for achieving sustainable economic development goals in Ghana and other emerging economies.

Ade et al. (2018) investigated the determinants of tax revenue performance in 15 Southern African Development Community (SADC) countries during 1990-2010, using panel data. The study focused on the impact of FDI flows, tax rates and tax policy harmonization variables on tax revenue collection in the SADC. The study uses least square dummy variable (LSDV) fixed effect model (FEM) and the feasible generalized

least squares (FGLS) techniques in testing for country specificity. The extreme-bound analysis (EBA) technique is also used in delineating the various causal relationships. The FGLS result shows that the increase in FDI flows expand the tax base and tax revenue collection. Increase in corporate income tax and value added tax rates reduces the tax revenue implying that increase in tax rates results in increase in cost of business and reduction in tax revenue collection. And increase in tax harmonization policy enhances the tax revenue collection.

Gobachew et al. (2018) investigate the factors influencing tax revenue in Ethiopia using time series data from 1999/00 to 2015/16 using Ordinary Least Squares (OLS) method. The study finds the industry sector's contribution to GDP, per capita income, and trade openness positively impact tax revenue. Conversely, the agricultural sector's GDP share and the annual inflation rate exhibit significant negative effects on tax revenue.

Terefe and Teera (2018) conducted an empirical study to explore he key determinants of tax revenue for nine East African countries using the broader data ranging from 1992 to 2015 by employing the multivariate panel co integration approach. GDP Per capita, Foreign aid, urbanization, Openness, official exchange rate, share of Agriculture, industry and service in GDP and inflation has been taken as key factors to influence the tax revenue collection. The model estimation was made by using the FGLS and the dynamic panel data GMM model. The study found that per capita GDP, foreign aid, trade openness, share of agriculture, share of industry and share of services have positive contribution for tax revenue whereas urbanization, official exchange rate and rate of inflation have negative impact of the tax revenue to GDP ratio of east African countries.

Piancastelli and Thirlwall (2019) conducted a study on determinants of tax revenue and tax effort in developed and developing countries. The study measures the tax effort of developed and developing countries by taking sample of 59 countries over the period 1995 to 2015 by comparing a country’s actual tax/GDP ratio with the ratio predicted derived from an international tax function which relates tax revenue to various measures of a country’s taxable capacity such as the level of per capita income, the share of trade in GDP, the productive structure i.e. share of agriculture, service and industry in GDP, and the level of financial deepening measured by M2 as percentage of GDP. The tax function is estimated using cross section data, pooled time series/cross

section data, and panel data using a fixed effects estimator. The study found that per capita income, share of service's sector GDP has positive effects on tax revenue and seventeen of the thirty-four developing countries have a weak tax effort with a ratio less than unity and recommendations include widening the tax base, tacking avoidance and evasion and linking international aid to tax effort.

Awasthi et al. (2020) investigated the factors influencing property tax revenue using data from a range of countries including the United States, Canada, Australia, Chile, and OECD members from 2006 to 2016, employing a fixed effects model. Findings indicate that increases in GDP and population generally lead to higher property tax revenues, whereas higher federal transfers tend to reduce them. The study underscores the significant impacts of a country's development status, demographic profile, fiscal policies, and property tax-specific attributes on revenue collection.

Neog and Gaur (2020) examined the macro-economic determinants of tax revenue in india through dynamic simultaneous equation model using the data from 1981 to 2016. Analysis was done using lag augmented three stage least square (LA3SLS) model. Study uses three equations for tax, growth and gross fixed capital formation using 11 exogenous variables. The result shows that tax revenues are positively related to the development assistance, growth of the economy and trade openness however negatively with the inflation rate development expenditure and agriculture share in GDP. Capital formation is positively related with GDP growth rate whereas tax collection and current expenditure are negatively affecting the growth rate and the current tax revenues and growth are positively boosting capital formation whereas negative impact of central government liabilities.

Hamdan and Rana (2021) explored the impact of macroeconomic variables namely, GDP growth, agriculture, employment, manufacturing, and trade on tax revenue across seven emerging countries using the Ordinary Least Squares (OLS) method. Their study revealed that each country exhibited distinct determinants influencing tax revenue. For instance, India's tax revenue was positively associated with GDP growth, while Pakistan's was positively influenced by employment growth. Brazil benefited from trade growth, whereas Mexico experienced positive effects from employment growth but negative effects from trade growth. Malaysia, in contrast, was negatively affected by agriculture growth. China and Turkey shared four significant determinants—

agricultural, employment, manufacturing, and trade growth—where China's tax revenue was positively influenced by manufacturing growth but negatively impacted by the other factors. Conversely, Turkey was negatively affected by manufacturing growth but positively influenced by the remaining determinants. The study concluded that these variables can both positively and negatively affect tax revenue, highlighting the sector-specific revenue sources that guide tax policy decisions in each country

Saptono and Mahmud (2021) conducted a study on the macroeconomic factors influencing tax revenue and tax effort in Southeast Asian countries from 2008 to 2019. Their research utilized a Fixed Effects model with Driscoll-Kraay standard errors to analyze the impacts of various indicators on tax-to-GDP ratio and tax effort. Key findings include the positive and significant effects of per capita income, manufacturing sector activity, and trade openness on both tax revenue and tax effort. Conversely, inflation was found to have an insignificant effect on these tax performance metrics. The study also categorized countries into groups based on their levels of tax revenue and tax effort, using median benchmarks from the sample. The authors recommended policy strategies focusing on enhancing tax collection productivity through strengthening the revenue bases identified in their estimation model

Tsaurai (2021) carried out study to investigate the determinants of tax revenue in upper middle-income countries and to examine the interaction between foreign direct investment (FDI) and financial development on tax revenue, utilizing panel data spanning from 2007 to 2017. The study employs econometric methods such as dynamic generalized methods of moments (GMM), random effects, pooled ordinary least squares (OLS), and fixed effects. Key findings indicate that lagged tax revenue, financial development, FDI, economic growth, urbanization, human capital development, population growth, and their interactions significantly impact tax revenue positively. Conversely, exchange rate fluctuations and trade openness exhibit negative effects on tax revenue generation.

Minh Ha et al. (2022) studied the factors influencing tax revenue across Southeast Asia using data from eight countries. Utilizing various regression techniques including pooled Ordinary Least Squares (OLS), fixed effects (FE), random effects (RE), and dynamic panel data (system-generalized method of moments), the research identifies several key determinants. It finds that factors such as economic openness, foreign direct

investment (FDI), the ratio of foreign debt to GDP, and the share of value added in industry to GDP positively affect tax revenue. Conversely, official development assistance (ODA) exerts a negative impact. The study recommends that Southeast Asian nations focus on improving international trade policies, attracting FDI, accelerating economic restructuring, and enhancing their capabilities in managing foreign debt and assistance to bolster tax collection efforts.

Albimana and Hemed (2022) investigated the factors influencing the tax revenue to GDP ratio among four East African Community (EAC-4) countries. Analysis utilizes fixed and panel data approaches with data spanning from 2010 to 2020. The findings indicate that economic growth positively correlates with tax revenues, whereas agricultural sector growth hinders tax collection. However, the impacts of the manufacturing and service sectors on tax revenues are found to be statistically insignificant.

Ibrahim and Jairo (2023) investigate factors influencing tax revenue collection across Burundi, Kenya, Rwanda, Tanzania, and Uganda within the East African Community (EAC). Utilizing a panel dataset spanning 2009-2018, the study employed random effects estimation to analyze administrative efficiency indicators like the ratio of taxpayers to staff, revenue per staff, and cost of collection. Their findings suggested that while administrative efficiency initially boosts revenue performance, its long-term impact diminishes. Additionally, they highlight that institutional quality, particularly when interacted with per capita income, plays a crucial role in enhancing tax revenues in the short term. The study also identifies negative influences on tax revenue such as the size of the shadow economy, population growth rates, and levels of corruption.

Nugraha and Wijaya (2023) explored the factors influencing tax revenue in Latin America and the Caribbean (LAC) from 2002 to 2019. The research identified Foreign Direct Investment (FDI), Trade Openness (TO), and External Debt as key variables impacting tax revenue. Results indicate a negative effect of FDI on tax revenue, while trade openness and external debt positively influence tax revenue. Additionally, external debt moderates these effects by strengthening the impact of FDI and weakening the impact of trade openness on tax revenue.

Shojaeddin et al. (2023) estimated tax effort as an unobservable variable within the tax

revenue equation in Iran from 1970 to 2021 using a state-space model and the Kalman filter algorithm. The findings revealed relationship between various factors and the tax ratio. Per capita income was found to have a positive impact, whereas the agriculture shares in GDP exerted a negative influence. The coefficients of openness and monetization initially showed negative elasticity but transitioned to positive after reaching a certain threshold, indicating a dynamic relationship with the tax ratio.

The literature on determinants of tax revenue reveals insights across various regions and methodologies. Studies such as Addison and Levin (2012) in sub-Saharan Africa highlight the negative impact of the agricultural sector's GDP share on tax revenue, while noting positive effects from economic openness, peace, and the introduction of VAT. Muibi and Sinbo (2013) focus on Nigeria, emphasizing the responsiveness of tax revenue to income levels, exchange rates, and inflation. In OECD countries, Castro and Camarillo (2014) find positive influences from GDP per capita and the industrial sector, but negative impacts from agriculture and foreign direct investment. Ahmad et al. (2016) in Pakistan identify tax compliance and economic informality as significant factors affecting tax revenue. Gobachew et al. (2018) in Ethiopia highlight the industry sector's positive impact alongside negative effects from inflation and the agricultural sector. Studies on Ghana (Amoh and Adom, 2017), SADC countries (Ade et al., 2018), East African countries (Terefe and Teera, 2018), Southeast Asian nations (Saptono and Mahmud, 2021), upper middle-income countries (Tsaurai, 2021), and specific regional contexts like the East African Community (Ibrahim and Jairo, 2023) and Southeast Asia (Minh Ha et al., 2022) collectively underscore the diverse overview of factors influencing tax revenue.

2.3 National context

Timalsina (2007) conducted a study on tax elasticity and buoyancy in Nepal. The main objective or the study was to measure the elasticity and buoyancy of tax and to ensure whether or not the tax system in Nepal is elastic. GDP, tax revenue and proxy bases of tax revenue i.e. agricultural income, private consumption, import of goods and services for the period from 1975 to 2005 was analyzed through regression approach. The study found that the tax system in Nepal is inelastic (less than unity) in the period 1975-2005 with a more than unitary buoyancy coefficients, reflecting that the bulk of revenue collection emanates from discretionary changes in the tax policy, rather than from

automatic responses.

NRB (2017) conducted a study to estimate the elasticity and buoyancy coefficients of various revenue heads using autoregressive distributed lag (ARDL) approach to co-integration. The result found that the long-run buoyancy coefficients are greater than unity for all revenue heads except for custom duty whereas elasticity coefficients except for VAT are smaller than unity. Short-run buoyancy and elasticity coefficients for all revenue heads are found smaller than unity. All components of revenue besides income tax and VAT are found to be neutral to inflation.

Dangal (2018) investigated the elasticity and buoyancy of various taxes in Nepal utilizing secondary data published by the Nepalese government covering the fiscal years 2000 to 2016. The analysis focuses on the proportion of revenue sources relative to Gross Domestic Product (GDP) during this period, with a specific emphasis on tax and non-tax revenues. Study found that Nepal's tax system exhibited overall inelasticity over the study period, with direct taxes demonstrating lower elasticity compared to indirect taxes. Furthermore, the buoyancy coefficients of major taxes were found to exceed their respective elasticities significantly.

Ghimire (2019) studied role of tax towards government revenue of Nepal using secondary data from 2003 to 2017. Correlation and multiple regression analyses were separately conducted to assess the contribution of tax revenue to government revenue and GDP. The study aimed to determine the proportion of tax revenue in government revenue collection and analyze whether Nepal's resource gap was increasing or decreasing. The study found that both GDP and government revenue were strongly associated with direct and indirect tax revenues in Nepal.

Shrestha and Kautish (2020) empirically examined the impact of government revenue on economic growth in Nepal spanning the period from FY 2070/71 to FY 2074/75. Economic growth was considered as the dependent variable, with direct tax revenues, indirect tax revenues and non-tax revenue as independent variables. Secondary data from annual reports by the inland revenue department of Nepal, ministry of finance, and world bank reports were utilized, supplemented by interviews with tax experts and government officials to enhance understanding. The study concluded a positive relationship between different types of government revenues and economic growth,

highlighting significant positive impacts from indirect tax and non-tax revenues. However, the impact of direct tax revenue on economic growth was insignificant.

Bhoosal and Byanjankar (2022) conducted an empirical investigation into the factors influencing government revenue in Nepal. ARDL model was utilized for the analysis. They analyzed a range of macroeconomic indicators including GDP per capita, imports, consumer price index, exchange rate, and foreign aid covering the time frame from 1975 to 2021. Their study aimed to assess the effects of these variables on government revenue. The results of their analysis highlighted GDP per capita and imports as the primary determinants of government revenue in the short term. Additionally, in the long run, GDP per capita, imports, and exchange rate were identified as significant drivers of government revenue.

The studies conducted on tax elasticity and buoyancy in Nepal reveal consistent findings over different periods and methodologies. Timalsina (2007) concluded that Nepal's tax system is generally inelastic, indicating that changes in tax policy rather than economic fluctuations drive revenue increases. Similarly, NRB (2017) utilized the ARDL approach and found that while long-run buoyancy coefficients for most revenue heads exceed unity, indicating revenue growth outpaces GDP, elasticity coefficients are generally below unity, suggesting a limited economic response to tax changes. Dangal (2018) observed overall tax system inelasticity, with direct taxes showing lower elasticity than indirect taxes, and buoyancy coefficients significantly surpassing elasticities for major taxes. Ghimire (2019) and Shrestha and Kautish (2020) explored the broader impacts of government revenue on economic growth, highlighting positive relationships with indirect taxes and non-tax revenues, though direct taxes showed insignificant impacts on growth. Bhoosal and Byanjankar (2022) extended the analysis to 2021, identifying GDP per capita, imports, and exchange rates as critical determinants of government revenue, both in the short and long terms. Collectively, these studies underscore Nepal's tax system's overall inelasticity and highlight the significant role of policy changes in revenue collection, alongside varying impacts on economic growth depending on the type of tax revenue.

2.4 Research Gap

Review of literature provides insights into the macroeconomic determinants of tax

revenue in various regions and countries using various methodological approach and identified the various key determinants influencing tax revenue. In Nepal study has been conducted on elasticity and buoyancy of taxation by (Timalsina, 2007), (NRB, 2017) and (Dangal,2018). Ghimire (2019) and Shrestha and Kautish (2020) explored effects of government revenue on economic growth, highlighting positive relationships with indirect taxes and non-tax revenues, though direct taxes showed insignificant impacts on growth. Bhoosal and Byanjankar (2022) has studied determinants of Government revenue of Nepal using GDP per capita, imports, exchange rate, and foreign aid.

There is a notable gap in research specific to Nepal with respect to analysis of effects of key macroeconomics variables on tax revenue. This study will fulfill the gap with focused study specifically on tax revenue with by examining the effects of key macroeconomic variables such as share of service sector in GDP, foreign aid, foreign trade, and per capita income on tax revenue generation within the Nepalese context.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the step-by-step approach used to conduct this study in order to address the research questions and objectives discussed in Chapter 1. It explains how the study was designed, the framework used, and the methods chosen for gathering and analyzing data. This chapter lays the groundwork for the study's empirical findings and conclusions. By carefully selecting methods, the study aims to ensure that its exploration of the topic is thorough, valid, and reliable.

3.2 Research Design

This study employs a combination of descriptive and explanatory research methodologies to analyze the macroeconomic determinants influencing tax revenue in Nepal. The descriptive aspect involves systematically gathering and summarizing relevant data from reliable secondary sources to provide a comprehensive overview of Nepal's tax revenue trends and related economic indicators. By analyzing historical data on tax revenue collections, sectoral contributions, foreign aid, foreign trade and per capita GDP the study seeks to establish a clear understanding of the current state and patterns of macroeconomic variables influencing tax revenue. This analysis helps to identify key trends and patterns that may influence tax revenue dynamics over time.

Similarly, the explanatory research design helps into identifying and analyzing the underlying factors that influence variations in tax revenue over time. This involves formulating hypotheses based on economic theories and empirical evidence, and using appropriate statistical methods to test these hypotheses against the collected data.

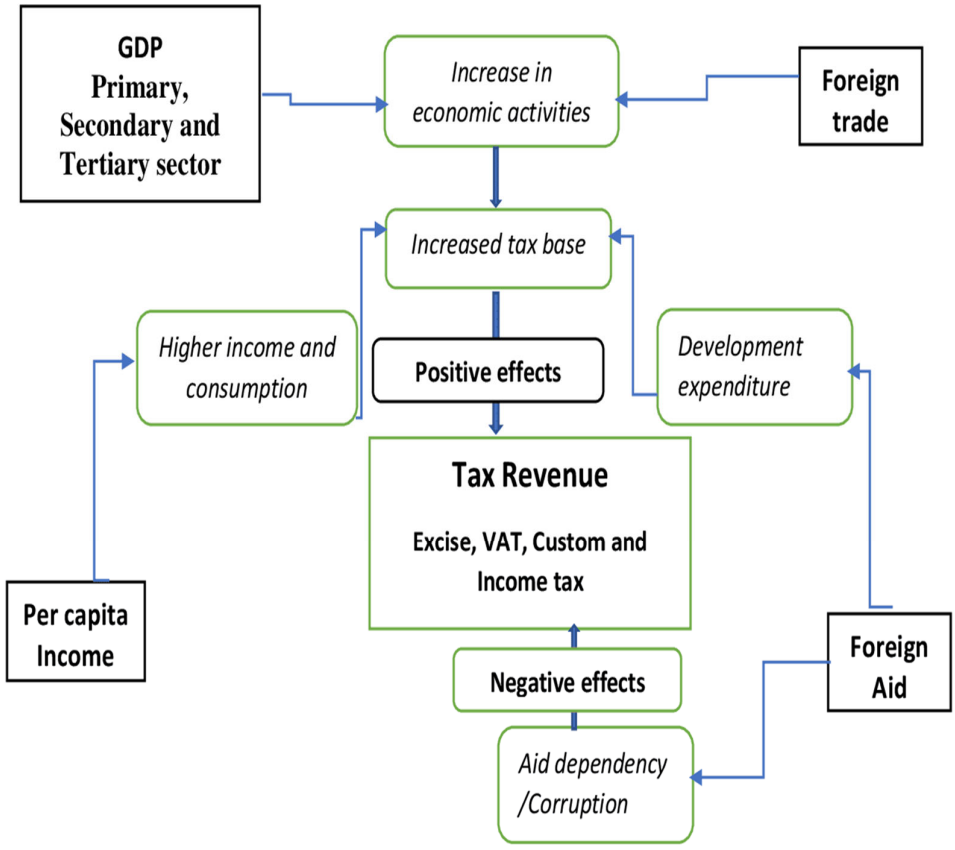
The descriptive component lays the groundwork by presenting a detailed overview of historical trends and patterns, while the explanatory component goes further to identify and analyze the specific drivers influencing these trends. Together, these complementary approaches enable a better understanding of how macroeconomic conditions, collectively influences tax revenue. By using both descriptive and explanatory methods, this study aims to give useful insights into how economic factors

affect tax revenue in Nepal

3.3 Conceptual framework

Based on the literature review, this study aims analyses the effects on tax revenue using key variable: service sector's GDP, per capita income, foreign aid, and foreign trade. The conceptual framework will explore how these variables influence tax revenue generation in Nepal's economic context.

Figure 3.1:
Determinants of Tax Revenue in Nepal.



Source: Derived from Tsaurai (2021), Piancastelli and Thirlwall (2019), Terefe and Teera (2018) Minh Ha et al. (2022)

Tax revenue is influenced by several key macroeconomic factors. Studies consistently show that per capita income (PCI) has a positive impact on tax revenue, attributed to heightened economic activity and increased consumer spending (Ahmad et al., 2016; Ayenew, 2016; Tsaurai, 2021). The service sector's share in GDP is another significant determinant, as it enhances tax revenue by expanding the economic base and fostering higher value-added activities (Piancastelli & Thirlwall, 2019; Terefe & Teera, 2018). However, the impact of foreign aid on tax revenue is mixed; while it provides supplementary fiscal resources, it may also undermine domestic revenue mobilization efforts (Castro & Camarillo, 2014; Amoh & Adom, 2017). On the other hand, foreign trade, characterized by openness and increased volume, generally contributes positively to tax revenue through enhanced economic transactions and potential tariff revenues (Zarra-Nezhad et al., 2016; Minh Ha et al., 2022).

3.4 Nature and sources of data

This study is based on analysis of secondary data ranging from 1974/75- 2020/21. Selection of the time is based on availability of data. All data are obtained from secondary data source from Ministry of Finance (MoF) and Nepal Rastra Bank (NRB).

Below is the summary of the variables and their respective sources:

Table 3.1:
Variables description and sources of data

Variables	Description	Expected sign	Data Source
Dependent Variable			
Tax Revenue (TR)	Growth rate of tax revenue		MOF's macroeconomic dashboard retrieved from https://data.mof.gov.np/data.aspx#
Independent Variable			
Service sector's GDP(SGDP)	Growth rate of service sector' GDP	+	National Accounts data from NRB
Foreign Trade (Trade)	Growth rate of foreign trade	+	NRB's Current Macro economic and financial situation annual data table 2021-22
GDP per capita (PCI)	Growth rate of per capita GDP	+	National Accounts data from NRB
Foreign Aid (FA)	Growth rate of Foreign Aid	+	NRB's Current Macro economic and financial situation annual data table 2021-22

Service Sector's GDP (SGDP): Nepal's economy is currently led by service sector contributing more than 60 percent on GDP. Since 2006/07share of service sector's on GDP accounts more than 50 percent. The expansion of SGDP signifies increased economic activity across sectors like tourism, telecommunications, real state, financial services etc., which not only boosts overall GDP but also enlarges the tax base by increasing taxable transactions. Higher GDP generally implies a larger tax base and more economic transactions subject to taxation (Timalsina, 2007). The findings from study by Castro and Camarillo (2014) in OECD countries underscore the positive correlation between GDP growth driven by a robust service sector and enhanced tax collection capacities. As GDP grows, so does the potential revenue base for taxation, thereby influencing tax revenue positively.

Foreign trade (TRADE): Foreign trade significantly impacts tax revenue in Nepal through both imports and exports. Customs duties, tariffs, and VAT on imported goods are critical sources of revenue for the government, directly tied to the volume and value of imports. Nepal's participation in international trade agreements and its trade policies affect tariff revenues but also influence overall economic activity, potentially impacting income taxes and corporate taxes.

GDP per capita (PCI): PCI reflects the average income levels and economic welfare of population. Unlike GDP, which measures the total economic output of the country, PCI provides a more detailed view of income distribution among individuals and their standard of living. Higher PCI generally correlates with greater tax revenue potential. This is because higher incomes usually lead to increased consumer spending and higher taxable incomes.

Foreign aid (FA): FA tied to development projects and humanitarian assistance, directly contribute to infrastructure, healthcare, and education, potentially boosting economic activity and expanding the tax base through increased employment and productivity. Additionally, aid packages that support governance reforms and institutional capacity building can improve the government's efficiency and transparency in tax collection. However, aid dependency and the nature of aid distribution can pose challenges, such as reducing the government's incentives to mobilize domestic resources through taxation.

3.5 Specification of the Model

Autoregressive Distributed Lag (ARDL) model developed by Pesaran and Shin (1999) and further elaborated by Pesaran, Shin, and Smith (1997, 2001) has been used to examine the determinants of tax revenue in Nepal. This model is chosen for its ability to analyze both short-term dynamics and long-term relationships among variables over time. Before applying the ARDL model, the stationarity of variables is assessed using unit root tests. Stationarity tests are crucial as they indicate whether variables fluctuate around a stable mean, ensuring reliable model estimates. When the data are stationary, using Ordinary Least Squares (OLS) is suitable. OLS provides accurate and dependable estimates, which help in making reliable conclusions about the relationships between variables. However, if the data shows non-stationary patterns, using OLS might lead to incorrect conclusions due to misleading relationships between the variables (Bhatta, Adhikari, & Byanjankar, 2020). In case of variables of mixed order of integration, or a combination of stationary and non-stationary variables, the Autoregressive Distributed Lag (ARDL) model is appropriate.

ARDL bounds testing is then conducted to determine if there is cointegration among the variables, which indicates a lasting relationship over time. If cointegration is confirmed, the ARDL model is extended to include an Error Correction Model (ECM). The ECM adjusts for short-term deviations from long-term equilibrium, ensuring the model accurately captures the dynamic adjustment process towards equilibrium.

To illustrate the ARDL modeling approach, the following simple model was considered:

$$TRt = \beta o + \beta 1 PCIt + \beta 2 SGDPt + \beta 3 Tradet + \beta 4 FAt + \varepsilon t$$

Where,

TR represents tax revenue

PCI denotes per capita GDP

SGDP is service sector's GDP

Trade is total foreign trade (export plus import)

FA is foreign aid

βo is constant and $\beta 1,\ \beta 2, \beta 3, \beta 4$ are the coefficient factors of TR in relation to PCI, SGDP, Trade and FA

εt is the error term.

The error correction version of the ARDL model is given by:

$$\text{TRt} = \alpha + \sum_{i=1}^{p} \alpha_1 \Delta \text{TR}_{t-1} + \sum_{i=1}^{p} \alpha_2 \Delta \text{PCI}_{t-1} + \sum_{i=1}^{p} \alpha_3 \Delta \text{SGDP}_{t-1} + \sum_{i=1}^{p} \alpha_4 \Delta \text{trade}_{t-1} + \sum_{i=1}^{p} \alpha_4 \Delta \text{FA}_{t-1} + \lambda_1 TR_{t-1} + \lambda_2 \text{PCI}_{t-1} + \lambda_3 S\text{GDP}_{t-1} + \lambda_4 \text{Trade}_{t-1} + \lambda_4 \text{FA}_{t-1} + u_t$$

The first part of the equation with α, α_1,α_2,$\alpha_3$and α_4 represents short run dynamics of the model.

The second part with λ s represents longrun relationship. The null hypothesis in the equation is λ_1+$\lambda_2 + \lambda_3$+,$\lambda_4 = 0$, which means non-existence of long run relationship.

EViews software is utilized for estimation of the ARDL model, and conducting diagnostic tests to ensure model validity and reliability.

3.6 Techniques of data analysis

3.6.1 Unit root test

A unit root test is a statistical method used in time series analysis to determine whether a time series data set is stationary. Stationarity is an important concept in time series analysis because many statistical methods and models assume that the underlying data is stationary. Stationarity assumes constant mean, variance, and auto-covariance over time, is crucial for reliable statistical analysis of time series variables. Non-stationary data can lead to misleading results in regression analysis

To examine the presence of a unit root in time series data, various methods can be employed, including the Augmented Dickey-Fuller Test (ADF), Pantula test, Phillips Peron tests, Kwiatowski-Phillips-Schmidt-Shin (KPSS), and Elliot-Rothenberg-Stock Point Optimal (ERS). Among these, a frequently used approach is the Augmented Dickey-Fuller (ADF) test. ADF approach has been used by this study.

3.6.2 F- Bound test

The ARDL bounds testing approach, introduced by Pesaran et al. (2001), functions as a method for examining cointegration and determining the presence of a long-term relationship among variables. To assess the existence of a long-run equilibrium relationship between the variables, a bound test (F-version) for cointegration is

conducted. The F-statistic resulting from this test is then compared to critical values determined by the upper bound. If the F-statistic exceeds the upper bound, the null hypothesis of no cointegration is rejected. If it falls within the lower and upper bounds, the result is inconclusive, and if it is below the lower bound, the null hypothesis cannot be rejected.

3.6.3 Error correction Modeling

The ECM model incorporates short term dynamics to correct for deviations from long run equilibrium. If the F-bound test shows the cointegration among the variables an ARDL model can be estimated, and the lagged difference of the cointegrated variables is included in the ECM. It includes the error correction term (ECT), which captures the adjustment process towards the long-run equilibrium.

In bivariate model ECM is calculated as $\lambda(Yt-1-\beta0-\beta1Xt-1)$ where Yt is dependent variable and Xt is independent variable. $Yt-1$ and $Xt-1$ are the lagged levels of the variables. $\beta0$ and $\beta1$ are re parameters representing the long-run equilibrium relationship between Xt and Yt. λ is the coefficient of the Error Correction Term (ECT), which captures the speed at which the system corrects deviations from the long-run equilibrium. It is a measure of how quickly the variables adjust to changes and return to their long-term relationship. The negative sign of λ implies that the variables tend to adjust in the opposite direction of the deviation from equilibrium and helping model to the adjustment process of variables towards their long run equilibrium.

3.6.4 Diagnostic Testing

The ARDL model seeks to determine the optimal linear unbiased estimator (BLUE), prompting the need for diagnostic tests. These tests are conducted to validate and ensure the statistical robustness of the results. We assess misspecification (RESET), serial correlation, heteroscedasticity, stability, and normality in the residuals. If the model is free from these biases and yields satisfactory results, it can be considered reliable.

3.6.4.1 Regression Specification Error Test

The Ramsey Regression Specification Error Test (RESET), introduced by (Ramsey, 1969), examines whether non-linear combinations of the fitted values effectively

describe the explanatory variable in a regression model. It evaluates whether the chosen functional form of the model is appropriate. The test's null hypothesis states that H0:P= 0, indicating no model misspecification. Alternative Hypothesis H1: $P \neq 0$, suggesting model misspecification. RESET is employed to assess if the current model adequately represents the underlying relationships in the data or if adjustments are needed to improve its fit.

3.6.4.2 Serial Correlation LM Test

Serial correlation refers to the situation where the error terms in a regression model are correlated over time or across observations. The Breusch-Godfrey test, introduced by (Godfrey 1978) is utilized to assess whether serial correlation is present in a model. Serial correlation does not affect the unbiasedness of regression estimators; however, serial correlation affects the efficiency of the estimators. In the presence of serial correlation, estimators may not be as efficient as they could be if the errors were independent. The test's null hypothesis states that H0:P= 0, indicating no serial correlation in the model, while the alternative hypothesis proposes H1: $P \neq 0$, suggesting the presence of serial correlation in the model.

3.6.4.3 Heteroscedasticity Test

In both ordinary least squares (OLS) and autoregressive distributed lag (ARDL) models, it is assumed that the residuals exhibit constant variance, known as homoscedasticity. When this assumption is violated, and the residuals demonstrate non-constant variance, it is termed heteroscedasticity. In such cases, the estimated coefficients may no longer be BLUE (Best Linear Unbiased Estimators). Breusch-Pagan test has been employed to test heteroscedasticity which follow null hypothesis (H0): residuals exhibit constant variance, indicating homoscedasticity and alternative hypothesis (H1): residuals do not exhibit constant variance, indicating heteroscedasticity.

3.6.4.4 Normality Test

The Jarque-Bera test is employed to verify whether the residuals of a regression model adhere to a normal distribution, which is fundamental for valid statistical inference. Normality ensures that classic statistical tests, such as t-tests and F-tests, as well as

confidence intervals, provide accurate results. If residuals deviate from normality, these tests may yield misleading outcomes, affecting the reliability of regression coefficients and predictions. The test's null hypothesis assumes normal distribution of residuals, contrasting with the alternative hypothesis suggesting non-normal distribution due to skewness or kurtosis.

3.6.4.5 Stability Test

The CUSUM (Cumulative Sum) and CUSUMSQ (Cumulative Sum of Squares) tests are analytical tools used to assess the stability of coefficients in regression models, especially over time. Introduced by (Brown et al.,1975), these tests are essential for detecting structural changes or shifts in the relationships between variables that may affect the reliability of regression results. These tests operate on a graphical principle where cumulative sums of recursive residuals from the regression model are computed and plotted against upper- and lower-95 percent confidence bounds. The fundamental criterion for stability is whether these cumulative sums remain within these bounds. If the plots of CUSUM and CUSUMSQ do not cross the 5 percent significance lines, it indicates that the coefficients are stable over the observed period.

CHAPTER IV
DATA PRESENTATION AND ANALYSIS

4.1 Introduction

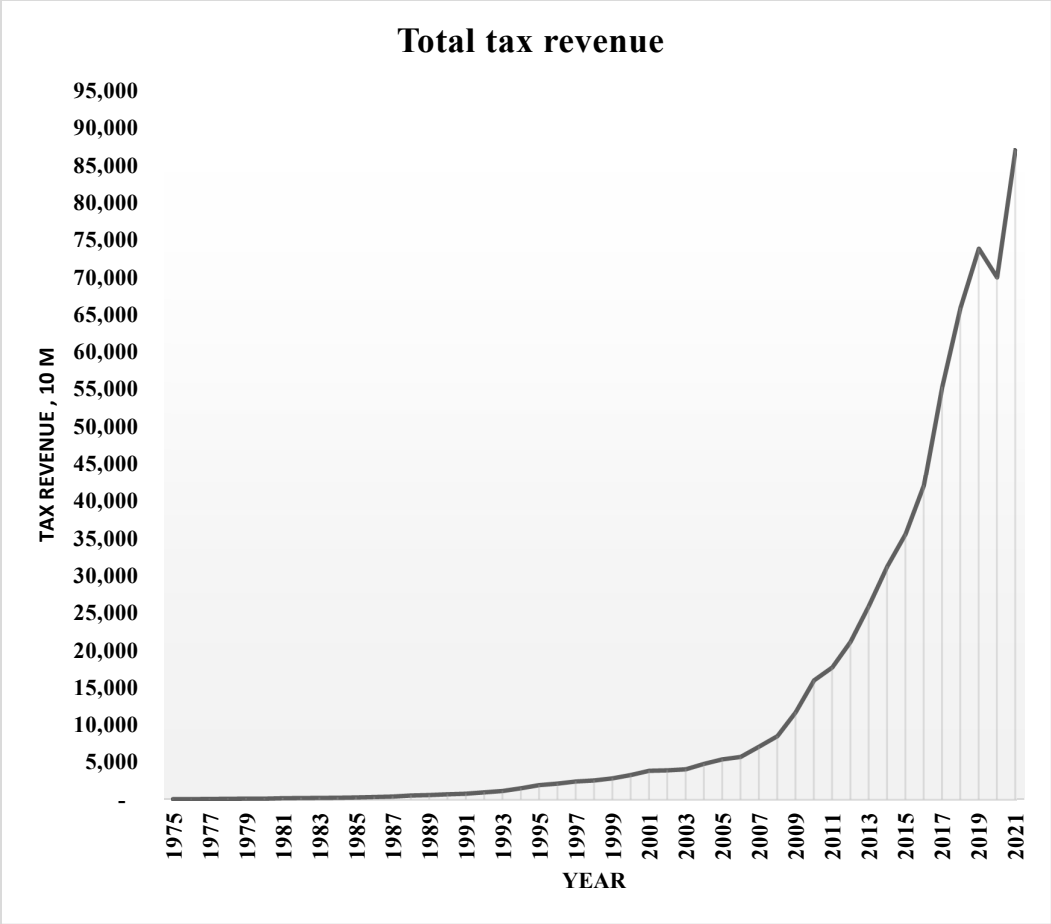
This chapter provides a comprehensive examination of the data, employing methodologies outlined in Chapter III for interpretation. It is structured into two primary sections. In the section analysis macroeconomics variables namely Tax Revenue (TR), Foreign Trade (Trade), Gross Domestic Product of the Service sector (SGDP), GDP per capita (PCI), and Foreign Aid (FA) has been done. This section aims to find out trends and structures, patterns within these variables, providing a comprehensive view of their evolution over time. Moving forward, Section 4.3 undertakes an empirical analysis through a series of rigorous methods. Section 4.4 summarizes the findings from the previous sections, discussing the implications of the results obtained. It offers insights into the observed relationships and patterns within the data, shedding light on how these economic indicators interact and influence each other.

4.2 Trend analysis of Variables

4.2.1 Tax Revenue

The modern tax system in Nepal evolved significantly following the establishment of democracy in 1951. Under the earlier Rana regime, taxes were limited to customs duties, excise duties, and land revenue, and collected through intermediaries. To unify and modernize tax procedures across the country, new laws were introduced such as the Excise Act 1958, Customs Act 1962, and Land Revenue Act 1964. Income tax was introduced in 1959 initially for business profits and salaries, later expanding to cover all sources of income in 1962 under the Income Tax Act. Over time, tax laws were updated, with significant changes in 2002 and the introduction of Value Added Tax (VAT) in 1997. Today, major taxes in Nepal include VAT, income tax, customs duties, and excise duties. Trend of total tax revenue is depicted in figure 4.1 below.

Figure 4.1:
Trend of tax Revenue

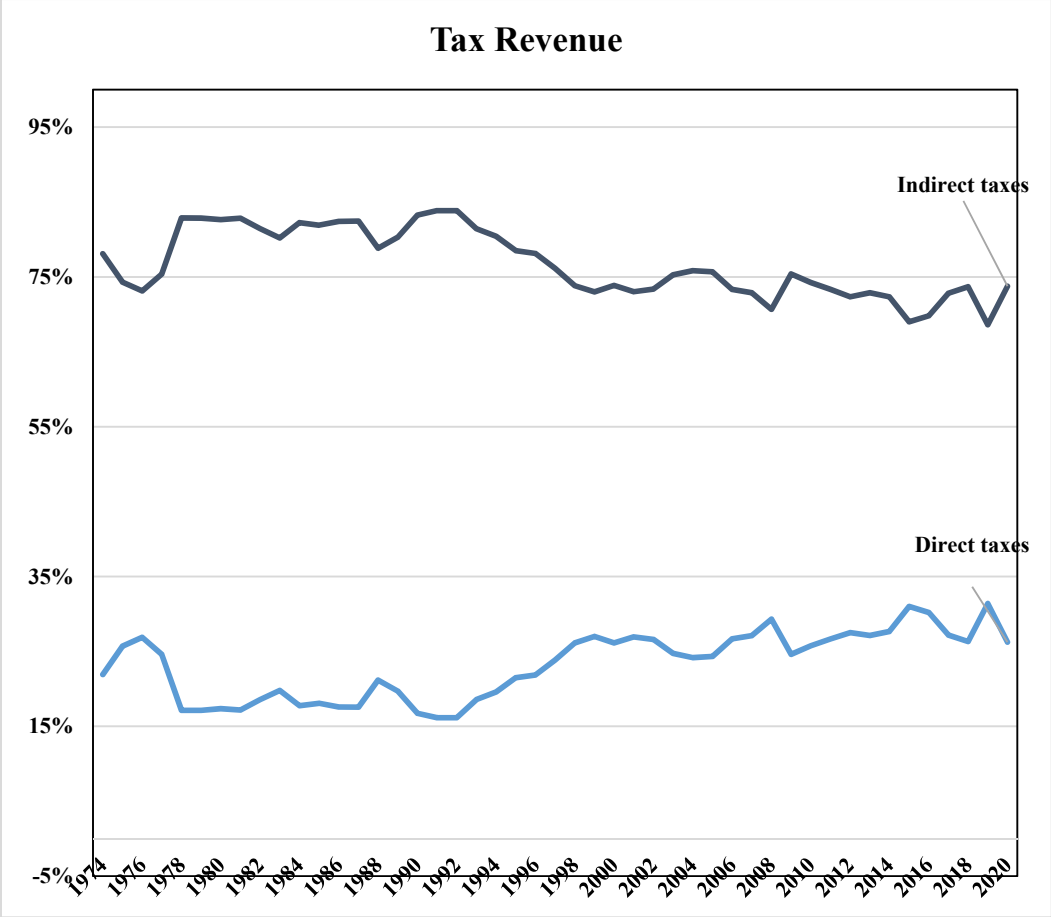


Source: Calculation using annexure I data

Tax revenue has been increasing over the year except in FY 2019/20 due to lockdown of COVID-19. Average growth rate of tax revenue was 14.36 percent during 1975-1985 it increases to 20.32 percent during 1986-1995. Higher growth rate of tax revenue has been witnessed during 1986-1995 due to trade liberalization. Trade liberalization fueled import as well as higher economic growth which help to increase in tax revenue after 1990s. Growth rate of revenue was lowest 10.78 percent during 1996 to 2005, due to internal conflict and political unrest. Growth rate of revenue increases, after settlement of conflict with signing of comprehensive peace accord in 2006, along with the effect of tax reforms policies, implementation of new Income Tax Act,2002, Custom Act 2007, the average growth rate of tax revenue during 2006 to 2015 was 21.10 percent. Tax revenue growth rate during 2016- 2021 remains 17.63 percent with negative growth rate (-5 percent) in FY 2019/2020 due to COVID pandemic. Composition of tax revenue

is given in figure 4.2 below.

Figure 4.2:
Tax Revenue composition



Source: Calculation derived from using data from MoF's macroeconomic dashboard

Indirect taxes are the major part of the tax revenue in Nepal. More than 60 percent of the total govt revenue and more than 70 percent of the tax revenue comes from the indirect taxes. Customs duties contributed the most 1990s. Share of custom duties on total tax revenue was 37 percent 1975-1985, 35 percent during 1986-1995, and 32 percent during 1996-2005. Decrease in customs with the various trade liberalization policy has been substituted by increase in VAT, with introduction of VAT in 1997. As on FY 2021, 21 percent of tax revenue comes from custom duties and 32 percent comes from VAT. Share of income tax remains between 20-30 percent on an average as presented in table 4.1 below.

Table 4.1:
Analysis of tax revenue

	1975-1985	1986-1995	1996-2005	2006-2015	2016-2020
Average growth rate of tax revenue	14.36%	20.32%	10.78%	21.10%	17.63%
Average Tax to GDP Ratio	6.62%	7.19%	8.70%	11.96%	16.44%
Average Share of direct tax revenue	20%	18%	25%	27%	28%
Average Share of indirect tax revenue	80%	82%	75%	73%	72%
Average Share of Sales tax / VAT	25%	26%	31%	34%	31%
Average Share of Custom duty/ Foreign trade tax	37%	35%	32%	22%	19%

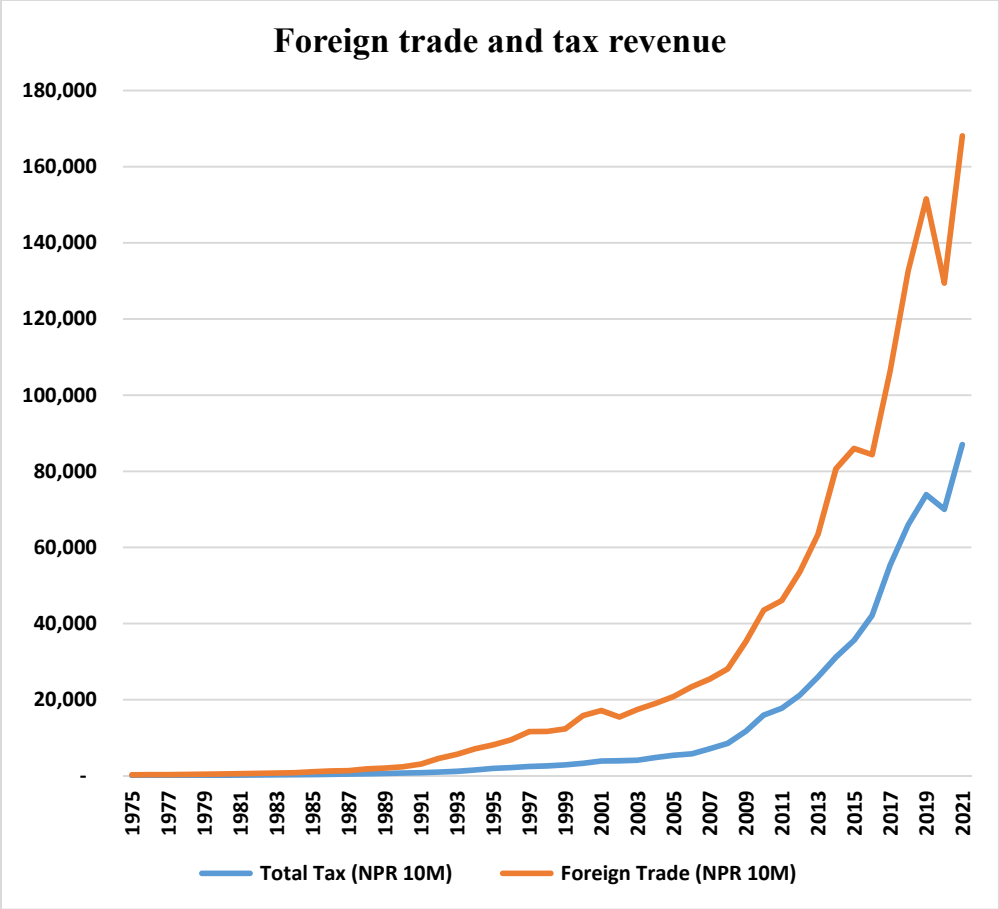
Source: Calculation using data from MoF's macro-economic dashboard

4.2.2 Foreign Trade

Foreign trade plays a crucial role in the economy. In 1992, Nepal initiated the unilateral liberalization of its trade and investment regime. Nepal is the first least developed country (LDC) to undergo the full accession process and join the World Trade Organization (WTO) in April 2004. Nepal has actively participated in regional agreements, including the South Asian Free Trade Area (SAFTA) and the Bay of Bengal Initiative for Multi-Sectoral, Technical and Economic Cooperation (BIMSTEC). Recognizing the pivotal role of trade in transforming a traditional agrarian economy into a modern one, Nepal adopted its Trade Policy in 2009. The implementation of this policy is carried out through Nepal's Trade Integration Strategy (NTIS) 2010.

Figure 4.3 shows the trend of foreign trade and tax revenue. It indicates a positive correlation where increases in foreign trade are accompanied by higher tax revenue. International trade is contributing significantly to government income through custom tariffs, VAT, and other taxes.

Figure 4.3*:*
Trend of foreign trade and tax revenue

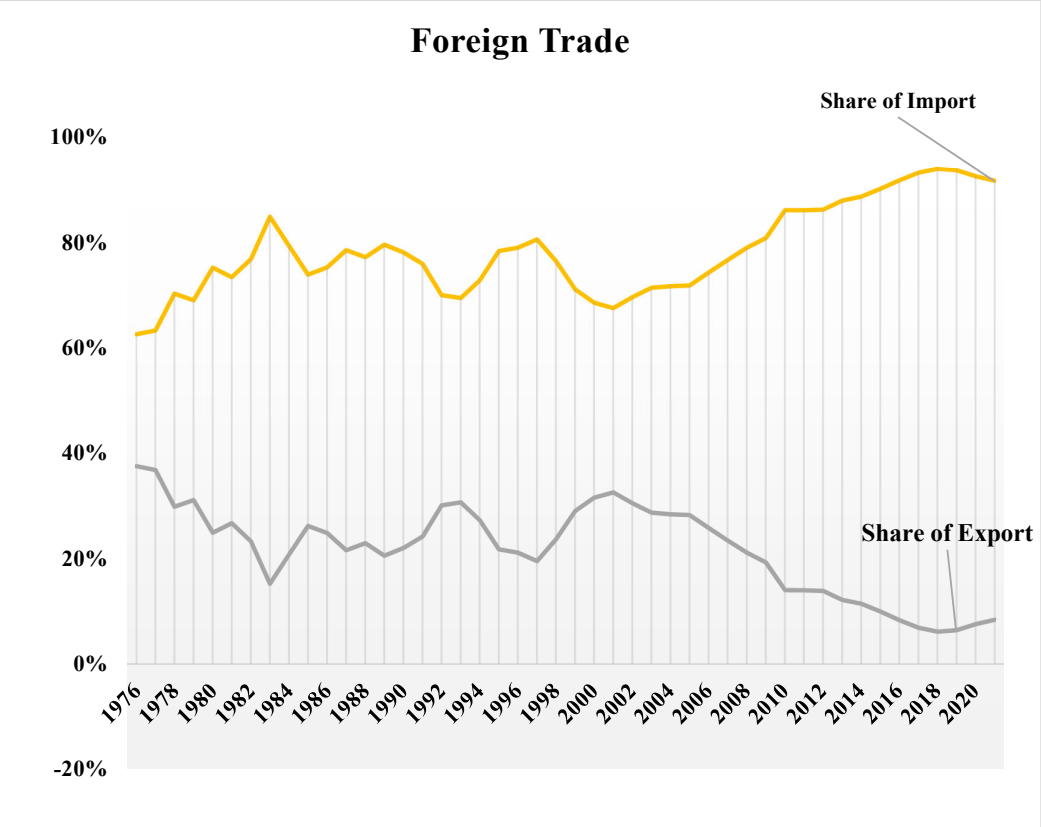


Source: Calculation using data from annexure I

Nepal's foreign trade has expanded over the years. The most significant growth occurred between 1990 and 1996, averaging 26 percent annually following the restoration of multiparty democracy in 1990. In 1992, a new industrial policy was introduced which assured that industries would not be taken over by the government, and there would be minimal government involvement. Additionally, a new foreign investment policy was implemented, allowing up to 100 percent foreign investment in most medium and large-scale industries (Khadka, 1993).

From 1998 to 2007, the growth rate slowed down to an average of 8.5 percent due to internal conflicts. After 2007, there was steady growth in foreign trade until 2021, except for decreases in 2015/16 when trade volume dropped by 2 percent due to earthquake followed by interruption at the southern border, and in 2019/20 when it decreased by 14.5 percent because of the COVID lockdown.

Figure 4.4:
Foreign Trade composition



Source: Calculation using data from NRB's macroeconomics and financial situation annual data 2021-22

Following Nepal's accession to the WTO, there has been a notable decline in the share of exports in total trade, decreasing from 28.20 percent in FY 2004/05 to 8.4 percent in FY 2020/21. Conversely, the share of imports has shown an upward trend, increasing from 71.8 percent in FY 2004/05 to 91.6 percent in FY 2020/21. Consequently, Nepal has experienced a widening trade deficit.

As of FY 2020/21, the Trade to GDP ratio stands at 38.62 percent, reflecting the significance of trade in relation to the country's Gross Domestic Product.

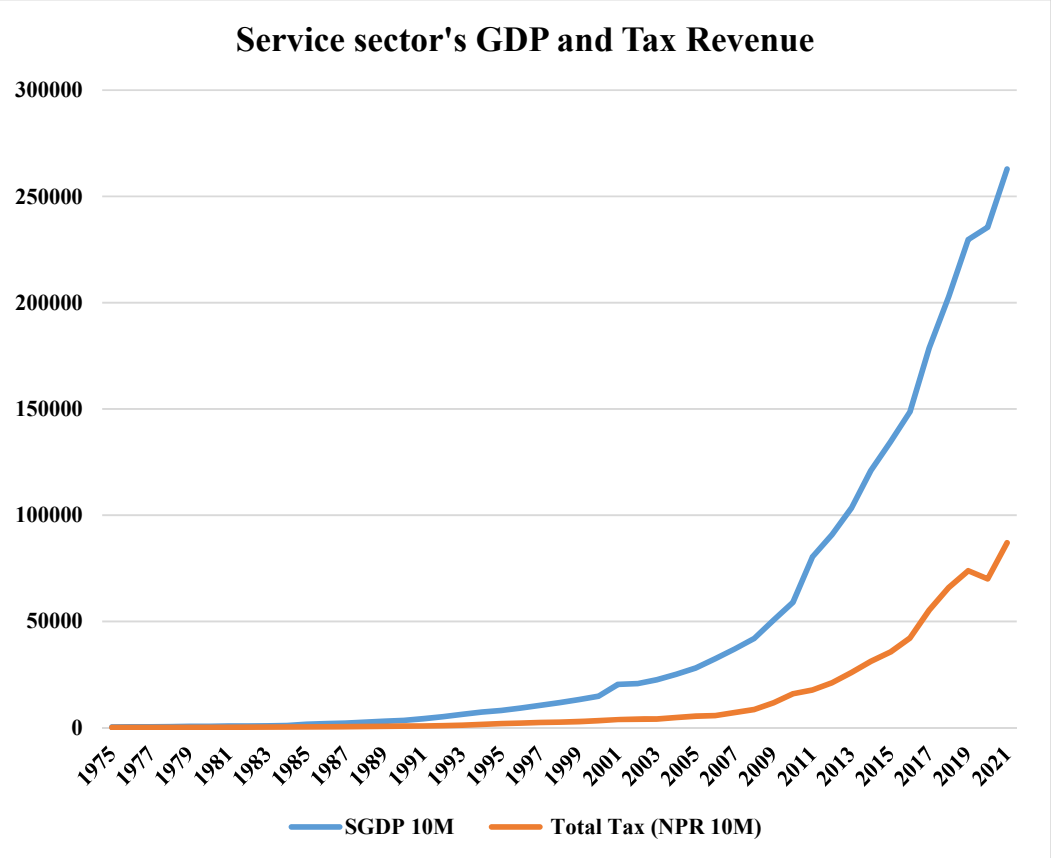
4.2.3 Service sector's share on GDP

Over the years, Nepal has generally witnessed favorable GDP growth, marked by fluctuations influenced by diverse factors such as economic policies, natural disasters, and global economic conditions. The Nepalese economy has faced several challenges,

including a decade-long Maoist insurgency from 1996 to 2006, a devastating earthquake in 2015, subsequent disruptions in supplies at the southern border, and the impact of the Covid-19 pandemic. Despite these adverse events, Nepal has undergone significant transformations, particularly in its political system, following the promulgation of the Constitution of Nepal in 2015.Notwithstanding the challenges, there is a positive trajectory in the economy. This positive direction can be attributed to ongoing economic policy reforms, the growth of the financial sector, the inflow of remittances, and other contributing factors.

Trend of service sector's GDP and tax revenue is presented in the figure 4.5 below.

Figure 4.5:
Trend of service sector's GDP and Tax Revenue

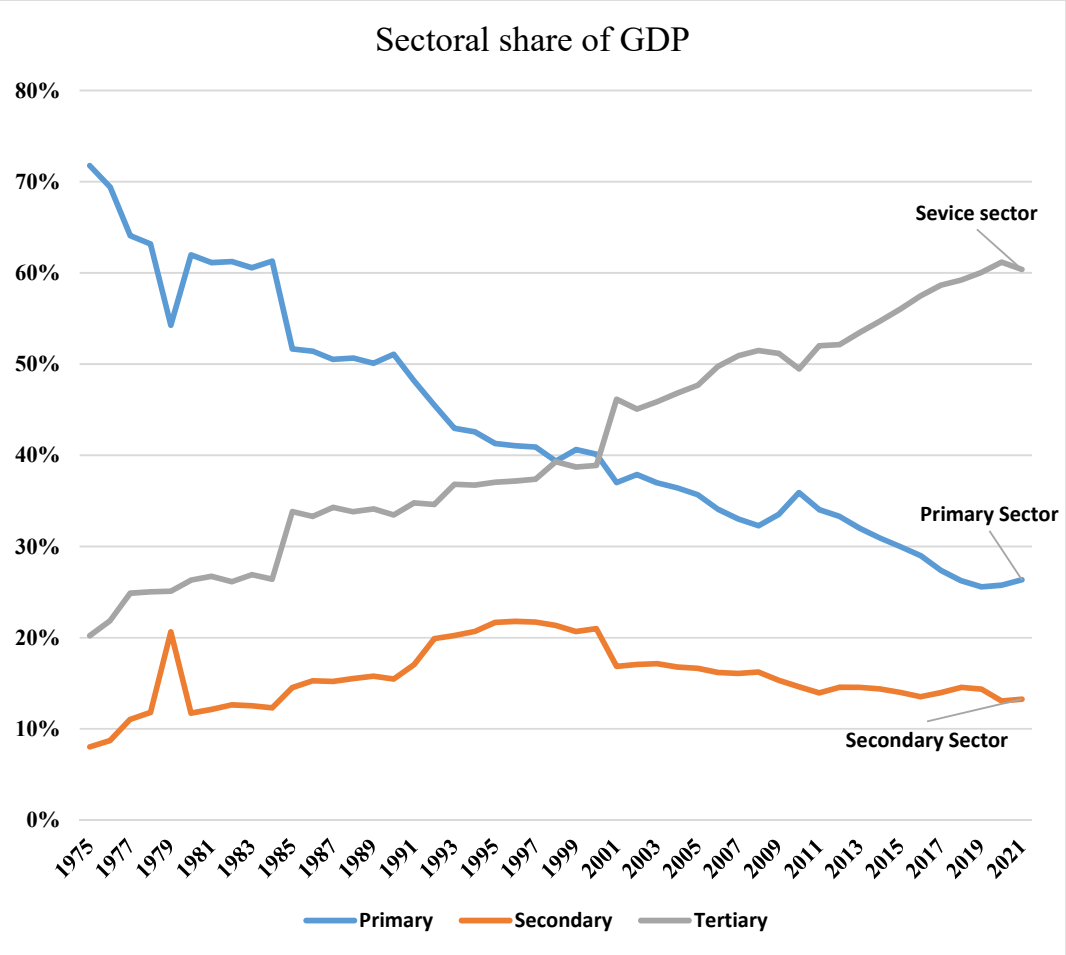


Source: Calculation using data from annexure I

Service sector's output has grown on an average annual rate of 16 percent over the past 47 years. This indicates the overall expansion of the country's service sector's output during this extended period. Both tax revenue and service sector's GDP are following

similar pattern which shows that there is positive correlation between the service sector's output and tax revenue. Sectoral composition of GDP is presented in figure 4.6 below.

Figure 4.6:
Sectoral share of GDP



Source: Calculation using national account's data of NRB

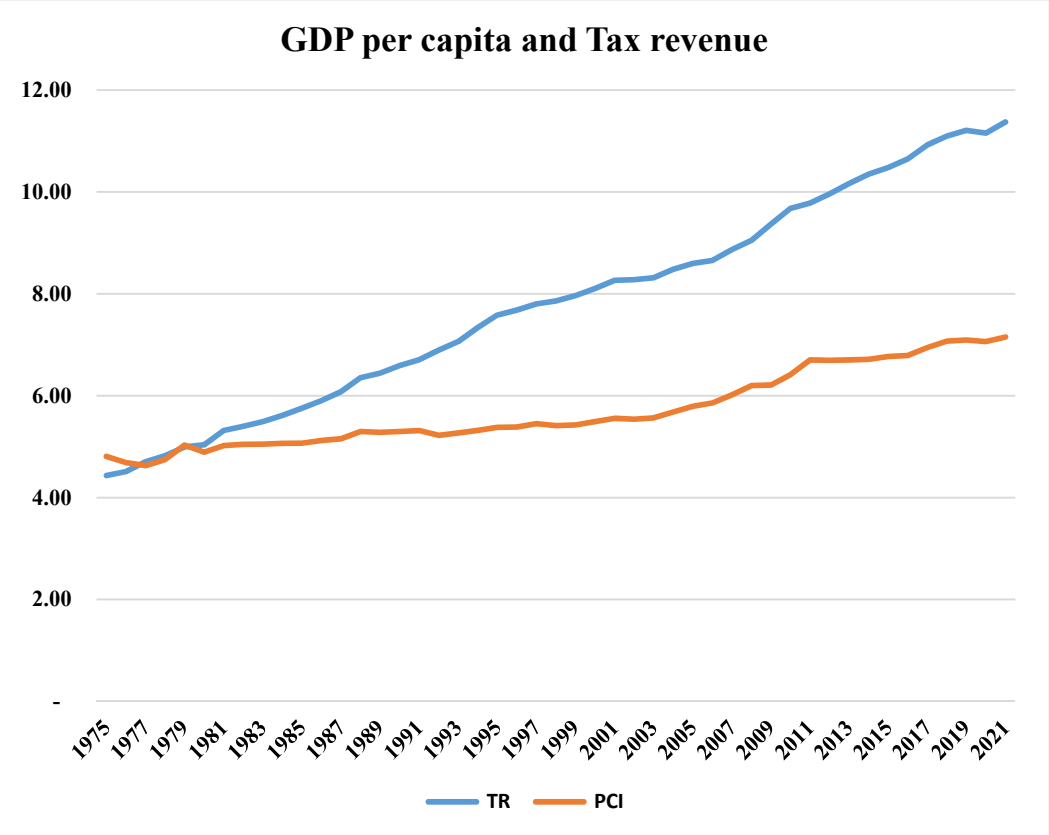
Traditionally, Nepal's economy has heavily relied on agriculture, contributing significantly to the Gross Domestic Product (GDP). However, there has been a gradual shift towards a more diversified economic landscape. The primary sector's share in GDP has notably decreased, from 72 percent in FY 1974/75 to 26 percent in FY 2020/21. This shift reflects a diminishing dependence on agriculture as the primary driver of economic output. In contrast, the service sector, encompassing services like real estate, housing, construction, tourism, and retail, has experienced substantial growth. Its contribution to GDP has surged from 20 percent in FY 1974/75 to a substantial 60

percent in FY 2020/21. The expansion of the service sector is closely linked to activities fueled by high foreign remittances, indicating a connection between service sector growth and the influx of remittances from Nepali workers abroad

4.2.4 GDP per capita

The per-capita income of Nepal has been on an upward trajectory, indicating positive economic growth; however, the rate of increase has been modest. It was USD 123 in 1975 reached to USD 1,277 in 2021. Over the past 47 years, the average annual increment stands at 6 percent, showcasing a gradual but slow improvement. The more recent 10-year average growth rate has been notably lower at 4 percent, with a concerning negative growth of 3 percent recorded in FY 2019/20. We can see the similar pattern in the tax revenue and GDP per capita in the figure 4.7, as income grows revenue is also growing.

Figure 4.7:
Trend of GDP per capita and tax revenue



Source: Calculation using data from annexure I

Note: value of per capita income is log transformation of value in US$ and tax revenue is log transformation of value in NPR10 million

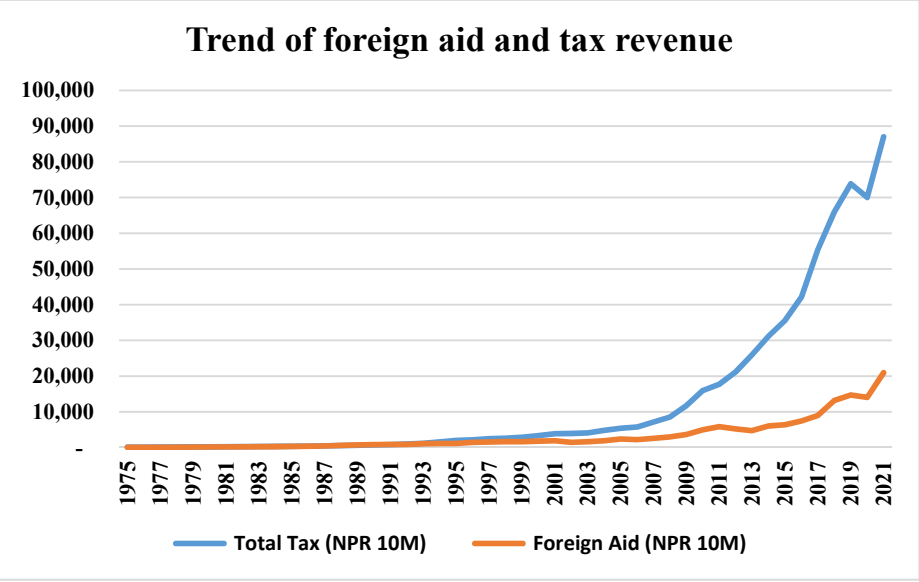
Despite the economic transition from agriculture to the service sector, agriculture remains the largest employing industry in Nepal. One in every five employed individuals is engaged in agriculture, underlining its continued significance in providing livelihoods. The trade industry follows closely, constituting the second-largest share of employment at 17.5 percent, and construction comes next at 13.8 percent. Furthermore, the informal sector holds a substantial share of employment at 62.2 percent, as per the Nepal Labor Force Survey 2017/18.

4.2.5 Foreign Aid

Nepal's first experience of foreign aid assistance began with the signing of the Four Point Program Agreement with the United States on January 23, 1951. In the 1960s and 70s, Nepal primarily received foreign aid in the form of grants, constituting almost 70 percent of the total foreign aid during this period. (Pandey,2017).

Figure 4.8 shows the trend of foreign aid and tax revenue, which illustrates a positive correlation between foreign aid and tax revenue, showing that as foreign aid increases, tax revenue also tends to increase.

Figure 4.8:
Trend of Foreign Aid and tax revenue

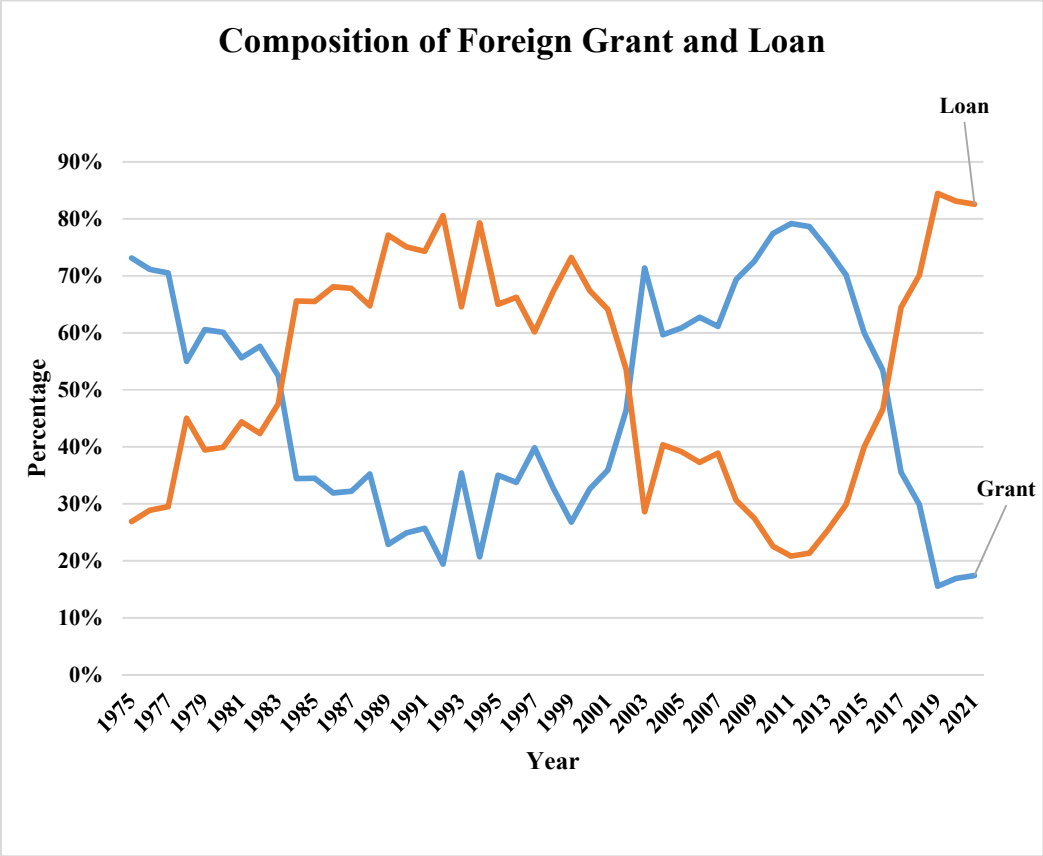


Source: Calculation using data from annexure I

Over the past 47 years, foreign aid has exhibited a rising trend, experiencing an average annual growth rate of 16 percent. During the period from FY 1974/75 to FY 1984/85, there was a predominant share of grants, averaging approx. 60 percent. However, starting from FY 1985/86, the composition shifted, with the share of loans increasing and reaching an average of 68 percent until FY 2001/02. This change was attributed to funding from institutions like the World Bank and IMF for implementing structural adjustment programs. There has been a significant decline in the share of foreign grants, from 60 percent in FY 2014/15 to 17 percent in FY 2020/21.

Composition of foreign aid is presented in figure 4.9 below.

Figure 4.9:
Composition of foreign aid

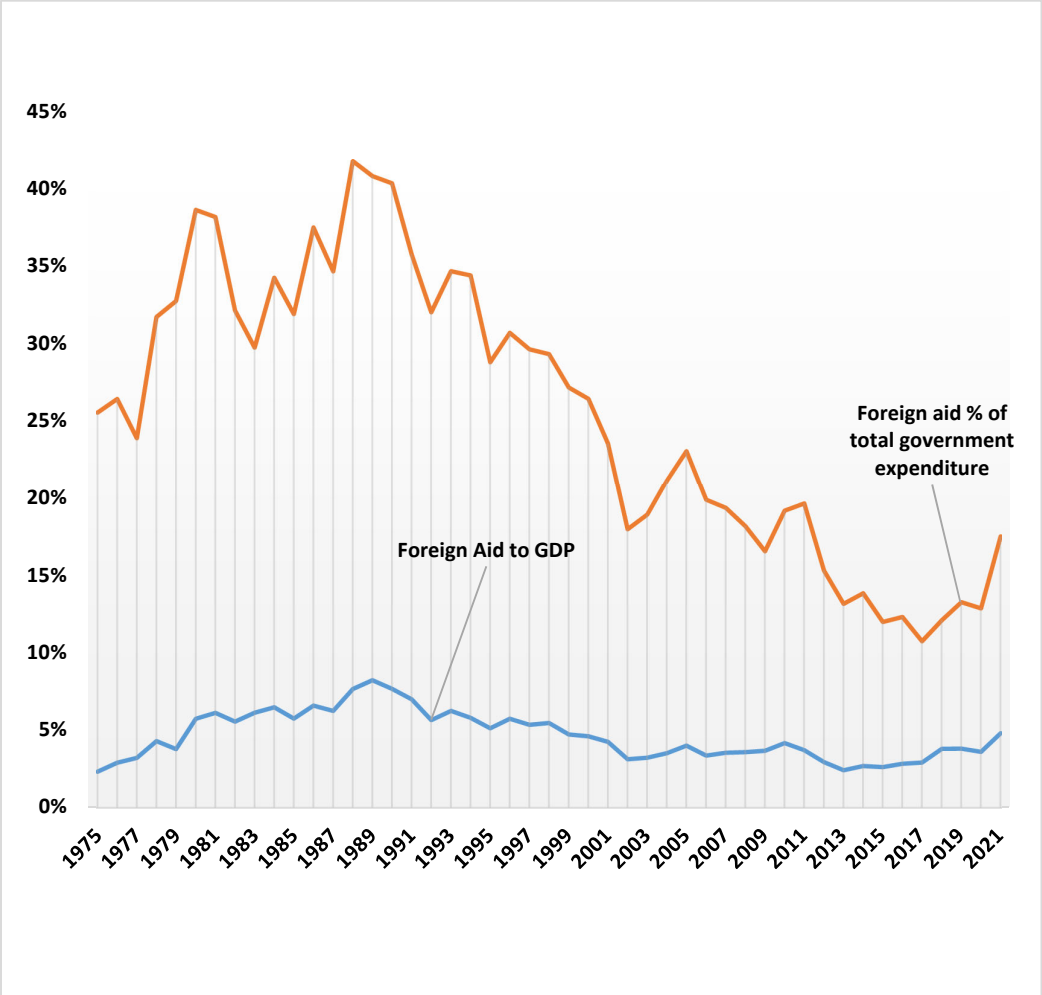


Source: Calculation using data from NRB's macroeconomics and financial situation annual data 2021-22

After FY 2002/03 again, the share of loan started to decrease and relatively share of grant is increases due to internal conflict and political turmoil in the country. With increase in social development indicators and requirements of funds to meet the Sustainable Development Goals 2030, share of loan in increasing in recent years. Share

of loan significantly increases from 40 percent in 2014/15 to 83 percent in FY 2020/21. Foreign aid to GDP and its share on government expenditure in presented in figure 4.10.

Figure 4.10:
Foreign aid to GDP and Govt. Expenditure



Source: Calculation using data from NRB's macroeconomics and financial situation annual data 2021-22

The mobilization of official development aid and development cooperation in Nepal spans approximately six decades, marking a significant aspect of the country's financial support for development. In the early years, exemplified by the first Development Plan (1956-60), foreign aid exclusively funded the entire development budget. The reliance on foreign aid remained prominent through the late 1980s, where it contributed around 75 percent of the development expenditure in each fiscal year during the early 1980s (Ministry of Finance ,2017)

Contribution of foreign aid on total government budget accounts 26 percent on an average during the period of 1974/75 to 2020/21, while foreign aid to GDP remains at 5 percent.

4.3 Empirical Analysis and Result

4.3.1 Descriptive Statistics

Descriptive statistics aims to describe and summarize the features of the dataset. It provides the concise overview of essential characteristics, pattern, trends within the data, facilitating the better understanding of its central tendencies and variability. The descriptive analysis used in the study consist of mean, median, maximum values, minimum values, standard deviation.

Table 4.2:
Descriptive Statistics

	TR	FA	Trade	PCI	SGDP
Mean	132,287	31,967	308,884	409	476,179
Median	25,940	15,032	116,516	227	118,232
Maximum	870,114	209,430	1,680,961	1,277	2,628,940
Minimum	842	387	2,704	102	3,353
Std. Dev.	224,900	451,108	441,774	350	719,307
Observations	47	47	47	47	47

Source: Calculation using annexure I data.

Note: Amount in NPR million except PCI which is in US$

Table-4.2 provides a descriptive analysis of the variables considered in the study. The dataset comprises 47 annual observations. Total Revenue (TR) ranges widely from NPR 842 million to NPR 870,114 million, indicating increasing trend in revenue over the years. Foreign Aid (FA) averages NPR 31,967 million, underscoring Nepal's reliance on external financial support. Trade volumes fluctuate notably from NPR 2,704 million to NPR 1,680,961 million, reflecting the country's increasing involvement in global trade and economic exchanges. Per capita income fluctuates between USD 102 and USD 1,239. Service sector's GDP varies from NPR 476,179 million to NPR 2,628,940 million, illustrating shifts in economic output.

4.3.2 Correlation Matrix

Table 4.3*:*
Correlation Matrix

	TR	FA	Trade	PCI	SGDP
TR	1				
FA	0.27	1.000			
Trade	0.57	0.30	1.000		
PCI	0.39	0.26	0.09	1.000	
SGDP	0.28	0.03	0.39	0.32	1.000

Source: Results obtained from Eviews11 using data from annexure I

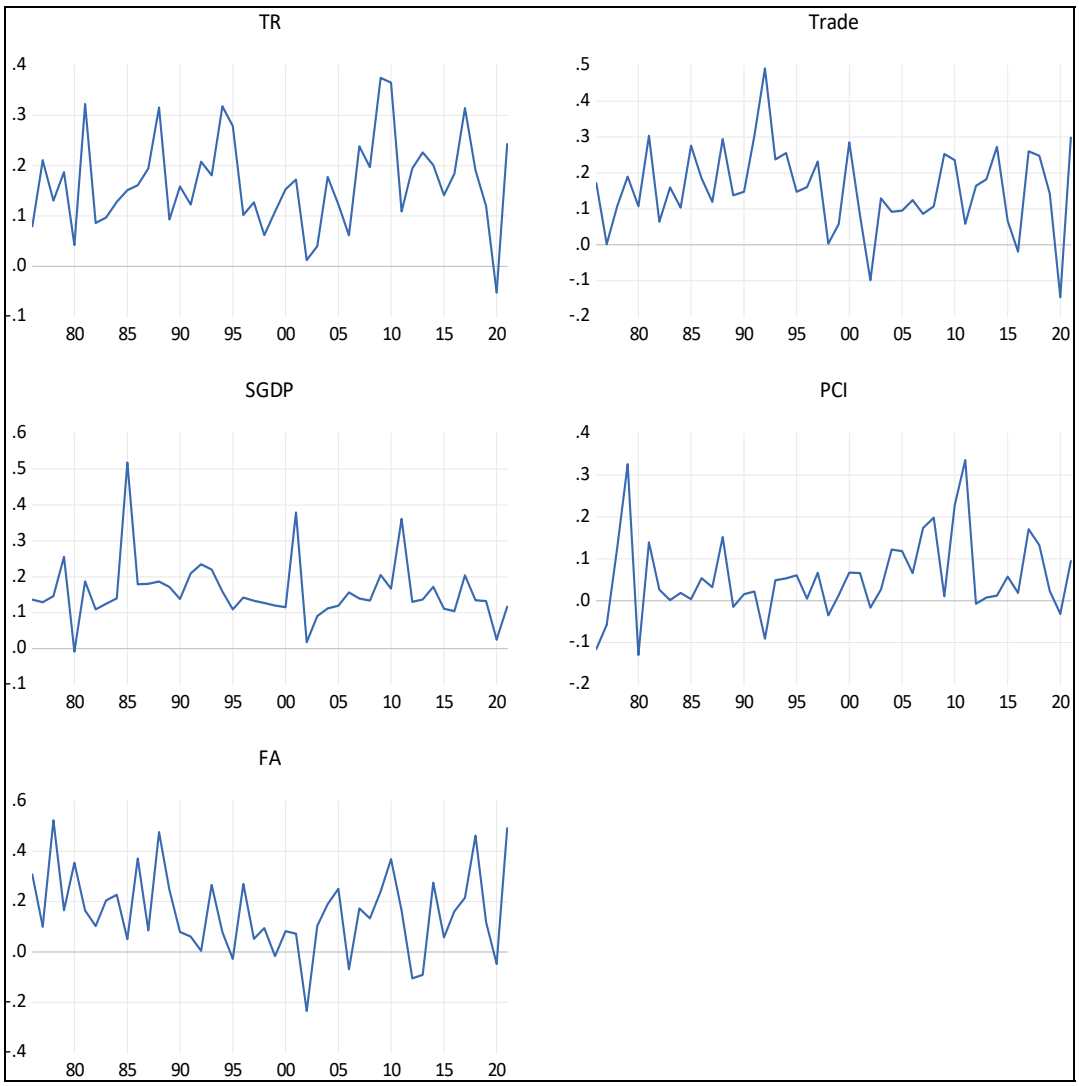
The correlation matrix presented in Table 4.3 shows into the relationships among key economic variables in Nepal over a span of 47 years. Each correlation coefficient indicates the strength and direction of associations between pairs of variables. Total Revenue (TR) demonstrates strong positive correlations with trade (0.57), and GDP per capita (0.39) because trade is the direct revenue base for revenue and per capita GDP signifies the income and purchasing power which directly influence revenue. However, there is positive but week correlation with SGDP (0.28) and FA (0.27). Positive correlation suggests that increases in total revenue are consistently associated with higher levels of foreign aid, greater trade volumes, improved per capita income, and enhanced SGDP growth.

4.3.3 Unit Root Test

In time series econometric analysis, determining the order of integration of variables is crucial for understanding their long-term behavior and relationships. The correct identification of integration orders is essential for selecting appropriate modeling techniques, which rely on stationary data for accurate estimation and reliable interpretation of results. Before doing the statistical tests, it's important to visually inspect the data by plotting the variables on a graph. This initial step is critical because it allows researchers to detect any structural breaks, identify potential data errors, and gain an understanding of whether the variables exhibit stationarity. Visual inspection helps to uncover patterns, trends, and relationships that may exist in the data, providing valuable insights before proceeding more detailed statistical analyses. Graphical

presentation of variable is presented below.

Figure 4.11:
Graphical test of unit root



Source: Results obtained from Eviews11 using data from annexure I

Form the above figure, we can get idea that all variables seem to be stationary with a bit of fluctuations, however to ensure this we need to do statistical test. This study employed the Augmented Dickey-Fuller test to rigorously assess the stationary properties of the variables. The results of the Augmented Dickey-Fuller (ADF) test for the stationarity of the variables are presented in Table 4.4.

Table 4.4:
Unit Root Test (ADF)

Variables	At Levels		At First Difference		
	t-statistic	Prob.	t-statistic	Prob.	Order of Integration
TR	-5.89	0.00	-6.32	0.00	I (0)
Trade	-2.77	0.22	-7.86	0.00	I (1)
FA	-6.49	0.00	-3.44	0.06	I (0)
PCI	-6.16	0.00	-4.79	0.00	I (0)
SGDP	-7.18	0.00	-4.22	0.00	I (0)

Source: Results obtained from Eviews11 using data from annexure I

The result of the ADF test shows that all the variables except trade are stationary at their levels and trade is stationary at first difference.

4.3.4 F-Bound Test

Table 4.5 presents the bound test result regarding the co-integration relationship between the variable. To test whether the long-run equilibrium relationship exist between the variables, bounds test (F-version) for cointegration is carried out. If the computed F-statistics is higher than the appropriate upper bound of the critical value, the null hypothesis of no cointegration is rejected, if it lies within the lower and upper bounds, the result is inconclusive, and if it lies below the lower bound, the null hypothesis cannot be rejected

Table 4.5:
Cointegration test: F-Bound Test

Table F-Bounds Test		**Null Hypothesis: No levels relationship**		
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	4.08	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.50%	2.88	3.87

Source: Results obtained from Eviews11 using data from annexure I

The F-statistics, as shown in Table 4.5, is greater than the upper critical value of 3.49, at 5 percent level of significance leading to the rejection of the null hypothesis indicating no cointegration. The presence of cointegration implies a long-run relationship among the series. Despite potential short-run shocks affecting individual

series, these variations are expected to converge over time in the long run. Consequently, we proceed to estimate both long-run and short-run models.

4.3.5 Long-run regression and Interpretation

F-bound test shows the cointegration among the variables. Since cointegration relationship has been established ARDL model can be constructed to examine both short run and long run relationship. The estimated coefficients for the long-run relationships are presented below

Table 4.6:
ARDL Long Run Coefficient

Selected Model: ARDL (4,4,4,4,4)
Model selection method: Akaike info criterion (AIC)
Long Run Coefficient

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRADE	0.765	0.177	6.52	0.00
SGDP	0.016	0.159	0.10	0.92
PCI	0.85	0.122	6.97	0.00
FA	-0.037	0.075	-0.5	0.62

Source: Results obtained from Eviews11 using data from annexure I

The table 4.6 shows the long run coefficient obtained from ARDL model. Based on the result foreign trade and per capita GDP are statistically significant at 5 percent and coefficient are positively correlated with tax revenue. This suggest that foreign trade and per capita GDP are the major determinants of tax revenue. Specifically, one percentage point increase in foreign trade and per capita GDP corresponds to increases of 0.765 and 0.85 percentage point in the tax revenue, respectively. This imply that as the economy grows through increased trade and higher per capita income, tax revenues also tend to increase. This could be due to higher economic activity leading to greater tax base and potentially higher tax rates being levied on increased economic transactions.

Service sector's GDP shows positive relation however the result is not statically significant, it indicates that increase in service sector GDP is not contributing the revenue generation and there is need of further study on effectiveness of tax policies and enforcement. Similarly, foreign aid shows negative and insignificant relation, this

raises the question whether foreign aid has been utilized for the productive purpose that contributes for future economic output/ benefits. Consequently, foreign trade and per capita GDP appear as significant determinants of tax revenue over the long run.

4.3.6 Short Run Result and Interpretation

Table 4.7:
ARDL Short Run Coefficient

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TRADE)	0.44	0.10	4.58	0.00
D(SGDP)	0.01	0.13	0.10	0.92
D(PCI)	0.31	0.15	2.10	0.05
D (FA)	0.15	0.07	2.18	0.04
Coint Eq (-1)	-2.15	0.38	-5.63	0.00
R-squared	0.904881			
Adjusted R-squared	0.822732			
Durbin-Watson stat	1.780527			

Source: Results obtained from Eviews11 using data from annexure I

Following the estimation of the long-run equation, we derive the error correction version of the ARDL model. Table 4.7 displays the short-run coefficients derived from the ECM variant of the ARDL model. Foreign trade shows a coefficient of 0.435, signifying an increase of 0.435 percentage point in the tax revenue for every percentage point change in Trade. This shows the significance of foreign trade on tax revenue. Significant portion of the tax revenue comes from foreign trade taxes.

Furthermore, per capita GDP demonstrates a positive coefficient of 0.308, indicating its positive relation with the tax revenue. As per capita GDP increases, it typically reflects higher income levels across the population and greater economic activity within the country and expand in tax bases.

The variable foreign aid shows positive significant result in short run unlike in long run. Foreign aid, comprising direct budgetary support, project financing, and debt components, initially enhances tax revenue by injecting immediate resources into governments. This influx stimulates economic activity via infrastructure projects and development initiatives, thereby boosting tax receipts in the short term. However, over the long run, dependence on debt-funded aid presents challenges, potentially leading to increased debt burdens and fiscal vulnerabilities.

Service sector GDP also exhibit statistical significance with positive coefficients, suggesting a positive influence on the tax revenue in the short run. The coefficient of the error correction term (CointEq(-1)) stands at -2.14 indicating a robust adjustment mechanism towards the long-run equilibrium following a system shock. This coefficient holds statistical significance, emphasizing the model's capacity to adapt and correct deviations. The values of R-squared (0.90) and adjusted R-squared (0.82) underscore the model's ability to explain a substantial portion of the variance in the dependent variable.

4.3.7 Regression Specification Error Test Result

The Ramsey RESET Test is employed to assess the accuracy of the specified functional form. The comprehensive results are outlined in Table 4.8 below.

Table 4.8:
RESET Result

Omitted Variables: Squares of fitted values

	Value	Df	Probability
t-statistic	0.258	16	0.799
F-statistic	2.86	(1, 16)	0.799

Source: Results obtained from Eviews11 using data from annexure I

The Results shows that the probability values associated with both the F-statistics and t-statistics are more than 0.05, affirming the appropriateness of the chosen functional form for the model.

4.3.8 Serial Correlation LM Test Result

A serial correlation test is conducted to assess whether the residuals or errors of a time series regression model exhibit correlation with themselves at different lags. In other words, it helps to identify if there is a pattern or systematic relationship among the residuals over time. The presence of serial correlation in the residuals may violate one of the key assumptions of classical linear regression. The Breusch-Godfrey test has been employed to examine the presence of serial correlation. Detecting serial correlation is crucial as its existence may lead to erroneous conclusions. The following table shows the test result.

Table 4.9:
Serial correlation Test.

Null hypothesis: No serial correlation			
F-statistic	1.65	Prob. F (2,30)	0.2082
Obs*R-squared	4.469	Prob. Chi-Square (4)	0.1070

Source: Results obtained from Eviews11 using data from annexure I

The result shows the prob of F- Stat is 0.208 which is more than 0.05 clearly indicates that there is no serial correlation.

4.3.9 Heteroscedasticity Test

The presence of heteroscedasticity can violate the assumption of homoscedasticity, which assumes that the variance of the errors is constant across all observations.

Table 4.10:
Heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	1.373	Prob. F (12,32)	0.353
Obs*R-squared	15.295	Prob. Chi-Square (15)	0.332
Scaled explained SS	6.067	Prob. Chi-Square (15)	0.913

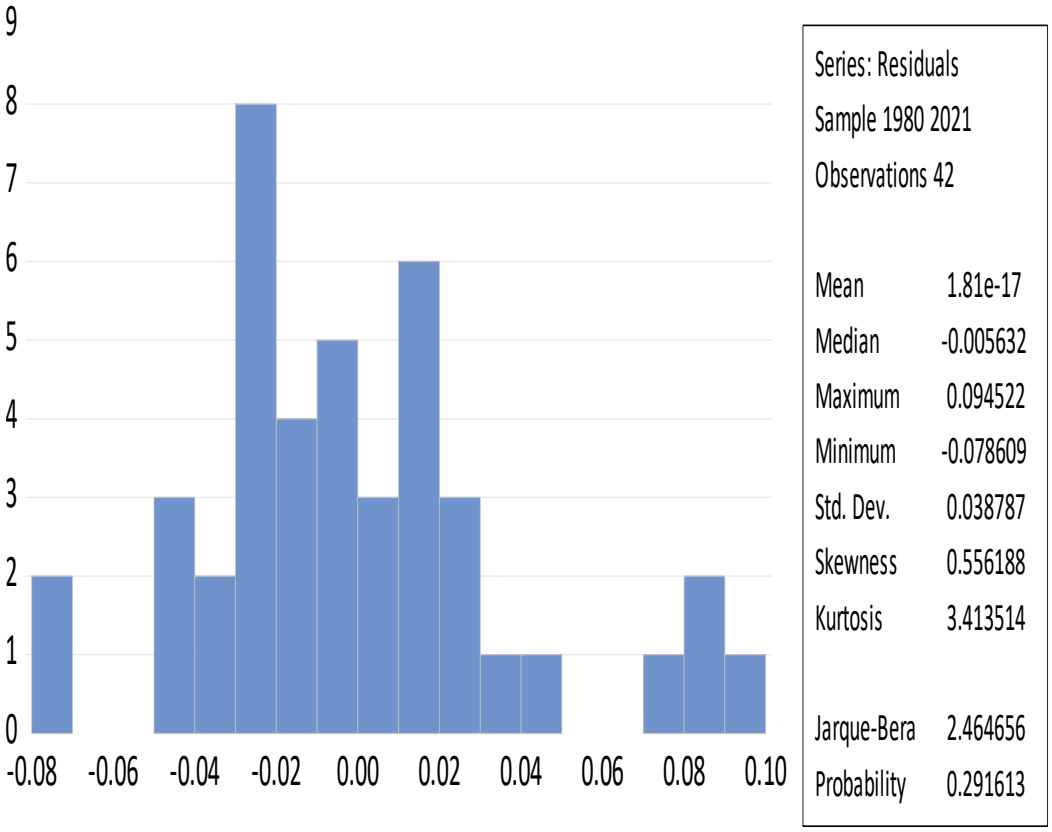
Source: Results obtained from Eviews11 using data from annexure I

Probability value of F-statistics is 0.353 is reflected in table 4.10 which exceeds the 5 percent significance level. This means the affirmation of null hypothesis implying there is no heteroscedasticity.

4.3.10 Normality Test

To assess the normality of residuals, the Jarque - Bera statistics is employed. In the figure, value of Jarque - Bera statistics is 2.46 with probability value 0.29 which is more than 5 percent significance level. Consequently, the outcome supports the acceptance of the null hypothesis, suggesting that the residuals follow a normal distribution. In other words, there is evidence to indicate that the assumption of normality for the residuals is reasonable based on this statistical test**.**

Figure 4.12:
Normality Test

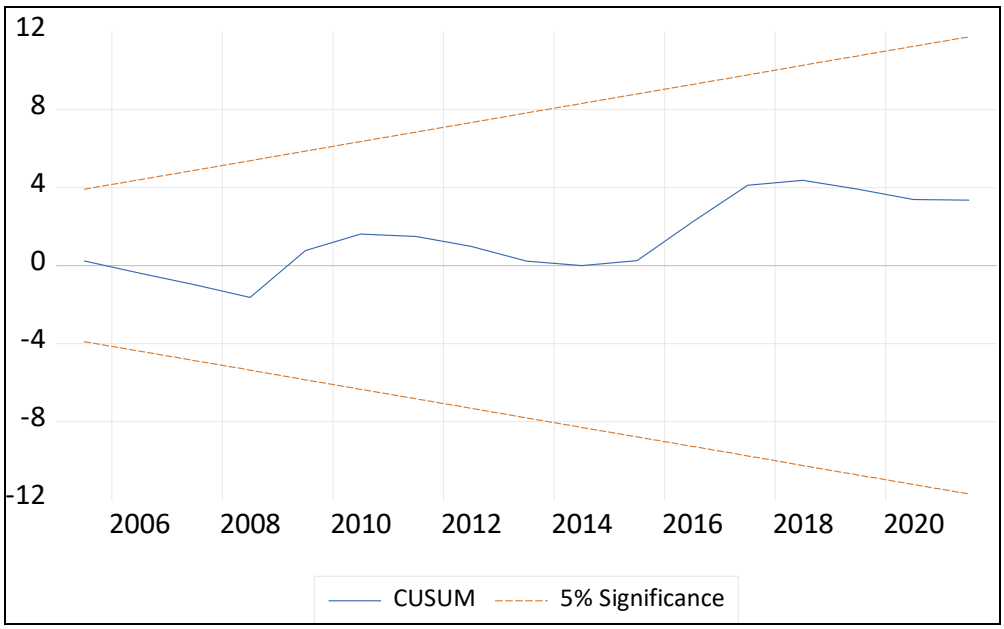


Source: Results obtained from Eviews11 using data from annexure I

4.1.1 Stability Test

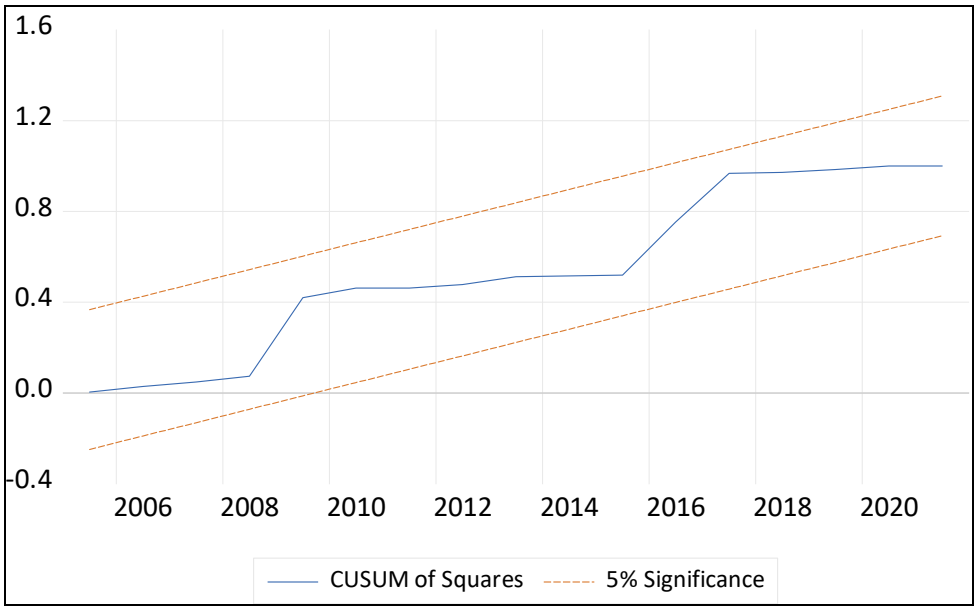
To assess the stability of both the long-run coefficients and short-run dynamics, cumulative sum (CUSUM) and CUSUM of Squares is employed. The stability of the estimated coefficients in the error correction model is depicted graphically in Figures 4.13 and 4.14.

Figure 4.13:
CUSUM Test



Source: Results obtained from Eviews11 using data from annexure I

Figure 4.14*:*
CUSUM Squares Test



Source: Results obtained from Eviews11 using data from annexure I

The graphical representations in figures 4.13 and 4.14 demonstrate that both the

CUSUM and CUSUM of Squares plots fall within the predefined boundaries. This observation serves as compelling evidence affirming the stability of the model.

4.4 Discussion

The results from the ARDL model shows the GDP per capita and foreign trade as the significant determinants of tax revenue of Nepal in both long run and short run. This is consistent with findings from studies done in various regions and time periods. Castro and Camarillo (2014), also supported these findings for OECD Countries, Terefe and Teera (2018), Minh Ha et al. (2022) highlighting the positive effects of per capita income in East African countries and Southeast Asia respectively. In Nepalese context study of Bhoosal and Byanjankar (2022) also confirms the foreign trade and per capita GDP are the major determinants of government revenue. This implies that as a country's GDP per capita increases, the potential tax base expands, leading to higher tax revenues for the government. Similarly, increased trade volume can directly contribute to customs duties and tariffs, which are forms of taxation on imports and exports. Higher foreign trade often correlates with economic growth, which in turn can stimulate domestic economic activity and tax revenues. This relationship has been observed in various studies across different regions. In Nepal foreign trade taxes constitute a significant portion of government revenue.

Foreign aid shows positive effects on tax revenue only in short run but it shows negative and insignificant effect on tax revenue in the long run. Effects of foreign aid varies across regions, Addison and Levin (2012) and Minh Ha et al. (2022) shows the negative effect of foreign aid in SSA and Southeast Asia while Neog and Gaur (2020) founds positive correlation between official development assistance and tax revenue. Foreign aid, which includes both direct budgetary support and project financing alongside debt components, initially boosts tax revenue by providing immediate resources to governments. This input can stimulate economic activity through infrastructure projects and development initiatives, thereby increasing tax receipts in the short term. However, in the long run, reliance on debt-funded aid may pose challenges. Countries may struggle with debt servicing obligations, limiting fiscal flexibility and diverting resources from productive investments that could sustainably grow tax revenue. Therefore, while foreign aid plays a crucial role in providing immediate relief and supporting development initiatives, its long-term effectiveness in enhancing tax

revenue depends on fostering economic self-reliance and establishing robust institutional frameworks for revenue generation and collection.

Service sector's GDP shows positive correlation with tax revenue however the result is not statistically significant. Study of Piancastelli and Thirlwall (2019) on 59 developed and developing nation, Terefe and Teera (2018) on East African Countries and, Castro and Camarillo (2014) on OECD shows positive effect of service sector's GDP on tax revenue. This signifies that there is need of more focused study on service sector's GDP and tax revenue to ensure that tax policies in Nepal are aligned with the dynamics of the service sector. This could involve reviewing tax policies and administration to encourage investment and growth in service industries while optimizing revenue collection.

CHAPTER V
SUMMARY AND CONCLUSION

5.1 Introduction

The summary and conclusion chapters of this thesis consolidate the findings and implications derived from the analysis of tax revenue determinants in Nepal. Chapter IV provides a detailed examination of historical trends and the impact of key macroeconomic variables such as the service sector's GDP share, foreign aid, foreign trade, and per capita income on tax revenue generation.

5.2 Summary

There are various factors influencing the Government's revenue collection efforts. This study tries to analyses the effects of macroeconomics variables on tax revenue of Nepal. Chapter I of the thesis provides a comprehensive introduction to the study on tax revenue in Nepal, outlining its background, objectives, and significance service sector's GDP, foreign assistance, foreign trade, per- capita income in tax revenue. In chapter II review of international and national studies on the determinants of tax revenue has been done. Internationally, studies across various regions highlighted factors such as GDP per capita, sectoral contributions, trade openness, foreign direct investment, foreign trade, inflation, exchange rate and other policy interventions affecting tax revenue. Nationally, studies in Nepal emphasized aspects like tax elasticity and the influence of macroeconomic indicators on government revenue. Despite extensive global research, a specific gap exists in understanding the unique determinants of tax revenue in Nepal. This study has been conducted with aim to fill this gap by examining the impacts of variables such as the service sector's GDP share, foreign aid, foreign trade, and per capita income on tax revenue generation within Nepal.

Chapter III introduced the methodological framework used to investigate the research questions concerning tax revenue determinants in Nepal. The study employed dual approach of descriptive and explanatory research methodologies. Descriptively, it synthesizes historical tax revenue trends and related macroeconomic variables using secondary data from Nepal's Ministry of Finance and Nepal Rastra Bank, spanning 1974/75 to 2020/21. Explanatory analysis delves deeper into the underlying factors influencing tax revenue variability over time. Drawing on a conceptual framework

developed from literature, key variables such as service sector GDP, per capita income, foreign aid, and foreign trade are analyzed. The study employs the Autoregressive Distributed Lag (ARDL) model, to explore long-term relationships and short-term dynamics among these variables. Diagnostic tests including unit root tests, F-bound tests for cointegration, and various statistical tests ensure robustness and validity of the model.

In chapter IV analysis of data has been done based on the framework provided in the chapter III. The summary of analysis and findings are presented below;

(i) From 1975-1985, Nepal experienced an average growth rate of tax revenue at 14.36 percent, which accelerated to 20.32 percent during 1986-1995, driven by trade liberalization. The growth rate slowed to 10.78 percent during 1996-2005 due to internal conflict and political unrest. Post-2006, following the peace accord, and implementation of new income tax act and value added tax, there was increase in tax revenue with an average growth rate of 21.10 percent during 2006-2015, reflecting stability and reform efforts. Despite a setback with a -5 percent growth rate in FY 2019/2020 due to the COVID-19 pandemic, the overall trend remained positive with a growth rate of 17.63 percent during 2016-2021. Indirect taxes, notably customs duties and VAT, comprises over 70 percent of tax revenue Direct taxes, primarily income tax, have maintained a stable contribution of 20-30 percent of total tax revenue, underscoring efforts in broadening the tax base and improving compliance.

(ii) Nepal's economic trajectory since the early 1990s reflects a deliberate shift towards trade liberalization and integration into global markets, followed by its accession to the WTO in 2004 and active participation in regional agreements like SAFTA. This strategic approach aimed to modernize Nepal's agrarian economy through increased foreign trade, supported by frameworks such as the Trade Policy of 2009 and the NTIS 2010.However, decline in export share, increasing import and a growing trade deficit, reflecting an imbalance in trade dynamics. The fact that trade accounted for 38.62 percent of Nepal's economy in 2020/21 highlights its crucial importance. Going forward, it will be essential to maintain growth in exports and tackle trade imbalances to ensure economic stability.

(iii) Nepal's economic has positive trajectory despite challenges such as political

unrest, natural disasters, and the COVID-19 pandemic. It underscores a shift from agriculture-dependent GDP towards a more diversified economic landscape, with significant contributions from the service sector. This transformation is evident in the declining contribution of the primary sector to GDP, dropping from 72 percent in FY 1974/75 to 26 percent in FY 2020/21, while the service sector's share surged from 20 percent to 60 percent over the same period.

(iv) There is gradual but modest improvement over the years in per capita GDP. Despite the transition towards a service-oriented economy, agriculture remains a vital source of employment, underlining its continued significance in livelihoods.

(v) Analysis of foreign aid provides insights into Nepal's dependency on external assistance, particularly through grants and loans. The study unveils a shifting trend in foreign aid composition, with a recent surge in loans, indicating changing dynamics in international financial support. This transition is evident in the composition of foreign aid, where grants decreased sharply from 60 percent in FY 2014/15 to 17 percent in FY 2020/21, while loans surged from 40 percent to 83 percent over the same period. Despite fluctuations influenced by internal conflicts and political turmoil, foreign aid has maintained a crucial role, contributing on average 26 percent to the total government budget between FY 1974/75 and FY 2020/21

(vi) Empirical analysis employing ARDL models Over the long term, the analysis identifies foreign trade and per capita GDP as robust drivers of tax revenue growth, supported by statistically significant coefficients indicating strong positive correlations. Specifically, a 1 percent increase in foreign trade and per capita GDP correlates with increases of 0.765 percent and 0.85 percent in tax revenue, respectively. In contrast, service sector GDP and foreign aid do not exhibit significant impacts on tax revenue over extended periods. In the short term, foreign trade, per capita GDP, and foreign aid display varying degrees of influence on tax revenue, with foreign trade showing the strongest impact. The error correction term underscores the model's responsiveness to deviations from long-term equilibrium, emphasizing the economy's ability to adjust tax revenue back to stable levels following temporary disruptions. These findings underscore the critical role of economic activities like foreign trade and income levels in driving tax revenue, suggesting targeted policies to enhance economic growth

could yield substantial fiscal benefits over time

5.3 Conclusion

This study explored the factors affecting tax revenue in Nepal, focusing on macroeconomic variables such as GDP per capita, sectoral contributions, trade openness, foreign aid, and foreign trade, aiming to understand their effect on government revenue collection over time. Over the years, Nepal experienced varying growth rates in tax revenue, influenced by factors like trade liberalization and political stability. Indirect taxes, particularly customs duties and VAT, played a predominant role, comprising over 70 percent of total tax revenue, while direct taxes remained stable. The shift towards a service-oriented economy underscored the need for policies supporting economic diversification and export growth. Despite challenges such as political unrest and the COVID-19 pandemic, Nepal's economy showed resilience, with noticeable shifts from agriculture towards the service sector. Analysis of foreign aid revealed a changing composition towards more loans than grants, indicating shifts in international financial support dynamics. The empirical analysis using ARDL models identified foreign trade and per capita GDP as significant drivers of long-term tax revenue growth, emphasizing the importance of policies that promote trade and economic productivity.

5.4 Recommendation

Based on this study, various recommendation can be made. Firstly, Heavy reliance on foreign trade taxes for government revenue can pose significant challenges to fiscal stability and economic dynamics. This dependency exposes governments to revenue volatility, as fluctuations in international trade volumes and commodity prices directly impact income streams. While foreign trade taxes can contribute to government revenue, excessive reliance on them risks fiscal stability, economic growth, and consumer welfare. Therefore, prudent fiscal management and policy reforms are necessary to address these risks and gradual diversification of revenue sources is crucial to mitigate potential fiscal shocks.

Secondly, the increasing flow of foreign assistance plays a pivotal role in advancing efforts towards achieving the Sustainable Development Goals (SDGs) by 2030. While it provides crucial resources for development projects, there is a notable concern that such aid does not directly contribute to government tax revenue. Utilization of foreign

aid for intended purpose alongside domestic revenue generation efforts is vital for achieving development objectives while reducing fiscal vulnerabilities.

Lastly, given the service sector being a major contributor to GDP and a growing segment of the economy, the observed correlation between the service sector's GDP and tax revenue has not been found to be statistically significant. In this case, it is necessary to identify the specific reasons behind this lack of statistical significance. This could involve conducting more detailed studies into the dynamics of tax collection within the service sector, examining the effectiveness of current tax policies and administration practices, and assessing any barriers or challenges that may hinder the translation of GDP growth into tax revenue and encourage voluntary compliance through simplifying tax procedures, improving enforcement mechanisms, and providing incentives.

REFERENCES

Abdioğlu, N., Biniş, M., & Arslan, M. (2016). The effect of corporate tax rate on foreign direct investment: A panel study for OECD countries. *Ege Academic Review, 16*(4), 599-610.

Addison, T., & Levin, J. (2012). The determinants of tax revenue in Sub-Saharan Africa. http://oru.diva-portal.org/smash/get/diva2:570456/FULLTEXT01.pdf

Ade, M., Rossouw, J., & Gwatidzo, T. (2018). Determinants of tax revenue performance in the Southern African Development Community (SADC). *Economic Research Southern Africa, working paper*, *762*.

Ahmad, H. K., Ahmed, S., Mushtaq, M., and Nadeem, M. (2016). Socio economic determinants of tax revenue in Pakistan: An empirical analysis. *Journal of Applied Environmental and Biological Sciences, 6*(2S), 32-42

Akitoby, B. Honda, J., Primus, K., & Keen, M. (2020). Tax Revenues in Fragile and Conflict-Affected States-Why Are They Low and How Can We Raise Them? *IMF Working Papers*, *2020*(143).

Albimana, M. M., & Moh'd Hemedb, I. (2022). The determinants of tax revenues among EAC members. *African Tax and Customs Review, 5*(1), 11-19

Amoh, J. K., & Adom, P. K. (2017). The determinants of tax revenue growth of an emerging economy – the case of Ghana. *International Journal of Economics and Accounting, 8*(3/4), 337

Awasthi, R., Le, T. M., & You, C. (2022). Determinants of property tax revenue: Lessons from empirical analysis. *Policy Research Working Paper No. 9399.* World Bank.

Ayenew, W. (2016). Determinants of tax revenue in Ethiopia (Johansen co-integration approach). *International Journal of Business, Economics and Management, 3*(6), 69-84.

Babatunde, O. A., Ibukun, A. O., & Oyeyemi, O. G. (2017). Taxation revenue and economic growth in Africa. *Journal of accounting and taxation*, *9*(2), 11-22.

Bhatta, S. R., Adhikari, P., & Byanjankar, R. (2020). Choice of Regression Models in Time Series Data. *Journal of Development Issues, 29*(1-2), 30-45.

Bhoosal, Y. L., & Byanjankar, R. (2022). An Empirical Study on the Determinants of Government Revenue in Nepal. *NRB Economic Review, 34*(2), 30-49.

Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relations over time. *Journal of the Royal Statistical Society, Series B, 37*(2), 149-163. https://www.jstor.org/stable/2984889.

Castro, G. Á., & Camarillo, D. B. R. (2014). Determinants of tax revenue in OECD countries over the period 2001–2011. *Contaduríay administración*, *59*(3), 35-59.

Debrun, M. X., & Kapoor, R. (2010). Fiscal policy and macroeconomic stability: Automatic stabilizers work, always and everywhere. *IMF Working Papers,2010*(111). International Monetary Fund.

Dangal, D. N. (2018). Analysis of elasticity and buoyancy and projection of tax in Nepal. *Tribhuvan University Journal, 32*(1), 106-116.

Drummond, P., Daal, W., Srivastava, N., & Oliveira, L. E. (2012). Mobilizing revenue in Sub-Saharan Africa: Empirical norms and key determinants. *IMF Working Papers, 2012*(108). International Monetary Fund.

Ghimire, P. (2019). Role of Tax Towards Government Revenue of Nepal. *International Journal of Business and Economics Research*, 8(3), 85-96. https://doi.org/10.11648/j.ijber.20190803.12

Gobachew, N., Debela, K. L., and Shibiru, W. (2018). Determinants of tax revenue in Ethiopia. *Economics, 6*(6), 58-64. https://doi.org/10.11648/j.eco.20170606.11

Godfrey, L. G. (1978). Testing against general autoregressive and moving average error models when the regressors include lagged dependent variables. *Econometrica: Journal of the Econometric Society, 46*(6), 1293-1301. https://www.jstor.org/stable/1913829.

Gupta, A. S. (2007). Determinants of tax revenue efforts in developing countries. *IMF*

Working Papers, 2007(184). International Monetary Fund.

Gupta, S., Clements, B., Pivovarsky, A., & Tiongson, E. R. (2003). Foreign aid and revenue response: Does the composition of aid, matter? *IMF Working Papers, 2003*(176). International Monetary Fund.

Hamdan, S., & Rana, F. (2021). Determinants of tax revenue in emerging countries. *Palarch's Journal of Archaeology of Egypt/Egyptology, 18*(13), 98-106

Ibrahim, A. J., & Jairo, I. J. (2023). Determinants of tax revenue performance in the East African Community (EAC) partner states. *African Journal of Economic Review, 11*(2), 55-63.

Inland Revenue Department. (2016). *Reform Plan 2015/16 to 2017/18*. Government of Nepal. https://www.ird.gov.np/public/pdf/1991132664.pdf

Khadka, R. B. (1993). *Economic liberalization in Nepal*. Seijo University.

Minh Ha, N., Tan Minh, P., & Binh, Q. M. Q. (2022). The determinants of tax revenue: A study of Southeast Asia. *Cogent Economics & Finance, 10*(1), 2026660.

Ministry of Finance. (2017). *A Study on Foreign Aid Mobilization in Federal Nepal.* https://www.mof.gov.np/site/publication-detail/1336

Muibi, S. O., & Sinbo, O. O. (2013). Macroeconomic determinants of tax revenue in Nigeria (1970-2011). *World Applied Sciences Journal*, *28*(1), 27-35.

National Planning Commission. (2018). *Sustainable development goals status and roadmap: 2016–2030*.

National Planning Commission. (2020). *Fifteenth Five-Year Plan 2018/19- 2023/24.*

Neog, Y., & Gaur, A. K. (2020). Macro-economic determinants of tax revenue in India: an application of dynamic simultaneous equation model. *International Journal of Economic Policy in Emerging Economies, 13*(1), 13-35.

Nepal Rastra Bank (2017). *Elasticity and Buoyancy of Taxation in Nepal: A Revisit of the Empirical Evidence.*

Nugraha, H. T., & Wijaya, S. (2023). The determinants of tax revenue in the context of international transactions in the Latin America and Caribbean (LAC) regions 2002-2019. *Ilomata International Journal of Tax and Accounting, 4*(3), 613-627. https://doi.org/10.52728/ijtc.v4i3.843

Pandey, K. B. (2017). Foreign Aid in Nepal. *Economic Journal of Development Issues*, *23*(1-2).

Pesaran, M. H., & Shin, Y. (1997). An autoregressive distributed lag modelling approach to cointegration analysis

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics, 16*(3), 289-326.

Pesaran, M.H., Shin, Y. & Smith, R.J. (1999). "Bounds Testing Approaches to the Analysis of Long Run Relationships

Piancastelli, M., & Thirlwall, A. P. (2019). The determinants of tax revenue and tax effort in developed and developing countries: Theory and new evidence 1995-2015 (No. 1903). *School of Economics Discussion Papers*.

Ramsey, J. B. (1969). Tests for specification errors in classical linear least-squares regression analysis. *Journal of the Royal Statistical Society. Series B (Methodological), 31*(2), 350-371. http://www.jstor.org/stable/2984219.

Raut, N. K., Chalise, N., & Thapa, P. (2014). Measurement of the underground economy in Nepal: A currency demand approach. *Economic Journal of Development Issues, 17*(1-2), 18.

Saptono, P. B., & Mahmud, G. (2021). Macroeconomic determinants of tax revenue and tax effort in Southeast Asian countries. *Journal of Developing Economies, 6*(2), 253-274.

Shojaeddin, R., Sameti, M., & Dehghan Shabani, Z. (2023). Determinants of tax revenue and estimation of tax effort trend in Iran. *Journal of Economic Research, 23*(88), 203-239. https://doi.org/10.22054/joer.2024.77050.1174

Shrestha, R., & Kautish, S. (2020). Impact of Government Revenue on to the Economic Growth of Nepal: A Case Study of Last Five Years. *LBEF Research Journal of Science, Technology and Management, 2*(3), 45

Small, O., Brown, L., & Canavire-Bacarreza, G. (2020). The fiscal policy response to public debt in developing countries. *Contemporary Economic Policy, 38*(1), 155-165.

Terefe, K. D., & Teera, J. (2018). Determinants of tax revenue in East African countries: An application of multivariate panel data cointegration analysis. *Journal of Economics and International Finance*, *10*(11), 134-155.

Timsina, N. (2007). Tax elasticity and buoyancy in Nepal: A revisit. *NRB Economic review, 19*, 9-21.

Tsaurai, K. (2021). Determinants of tax revenue in upper middle-income group of countries. *Journal of Accounting and Management, 11*(2), 148. https://doi.org/10.2284-9459JAM.2021.11.2.148

Zarra-Nezhad, M., Ansari, M. S., & Moradi, M. (2016). Determinants of tax revenue: Did liberalization boost or decline it? *Journal of Economic Cooperation and Development, 37*(2), 103-126.

ANNEXURE I
DATA

Fiscal Year (AD)	Total Tax (NPR 10M)	Per capita GDP(USD)	SGDP (NPR 10M)	Foreign Trade (NPR 10M)	Foreign Aid (NPR 10M)
1974/75	84	123	335	270	39
1975/76	91	108	381	317	51
1976/77	110	102	430	317	56
1977/78	124	115	493	352	85
1978/79	148	153	619	418	99
1979/80	154	133	614	463	134
1980/81	204	151	729	604	156
1981/82	221	155	809	642	172
1982/83	243	156	910	745	208
1983/84	274	159	1,037	822	255
1984/85	315	159	1,575	1,048	268
1985/86	366	168	1,856	1,242	367
1986/87	437	173	2,191	1,390	399
1987/88	575	199	2,599	1,798	589
1988/89	629	196	3,044	2,046	735
1989/90	728	199	3,464	2,348	794
1990/91	818	204	4,189	3,061	842
1991/92	988	185	5,172	4,565	846
1992/93	1,166	194	6,310	5,647	1,071
1993/94	1,537	205	7,313	7,086	1,156
1994/95	1,966	217	8,109	8,132	1,125
1995/96	2,167	218	9,260	9,434	1,429
1996/97	2,442	232	10,491	11,619	1,503
1997/98	2,594	224	11,823	11,652	1,646
1998/99	2,875	227	13,237	12,320	1,619
1999/00	3,315	243	14,762	15,833	1,752
2000/01	3,887	259	20,354	17,134	1,880

Fiscal Year (AD)	Total Tax (NPR 10M)	Per capita GDP(USD)	SGDP (NPR 10M)	Foreign Trade (NPR 10M)	Foreign Aid (NPR 10M)
2001/02	3,933	255	20,721	15,433	1,438
2002/03	4,090	261	22,593	17,428	1,589
2003/04	4,817	293	25,120	19,019	1,891
2004/05	5,410	328	28,115	20,818	2,366
2005/06	5,743	350	32,508	23,401	2,204
2006/07	7,113	410	37,046	25,408	2,585
2007/08	8,516	491	42,006	28,120	2,930
2008/09	11,705	497	50,600	35,217	3,635
2009/10	15,979	610	59,042	43,516	4,977
2010/11	17,723	814	80,384	46,051	5,800
2011/12	21,172	808	90,839	53,593	5,189
2012/13	25,961	814	103,284	63,366	4,720
2013/14	31,180	824	121,048	80,636	6,020
2014/15	35,594	871	134,477	86,000	6,371
2015/16	42,144	888	148,484	84,372	7,400
2016/17	55,387	1,039	178,789	106,316	8,995
2017/18	65,949	1,177	202,798	132,646	13,155
2018/19	73,860	1,204	229,700	151,564	14,727
2019/20	70,006	1,167	235,482	129,451	14,036
2020/21	87,011	1,277	262,894	168,096	20,943

Data in growth rate

Year	Tax Revenue	Per capita GDP	SGDP	Foreign Trade	Foreign Aid
1976	8%	-12%	14%	17%	31%
1977	21%	-6%	13%	0%	10%
1978	13%	13%	15%	11%	52%
1979	19%	33%	26%	19%	17%
1980	4%	-13%	-1%	11%	35%
1981	32%	14%	19%	30%	17%
1982	9%	3%	11%	6%	10%

Year	Tax Revenue	Per capita GDP	SGDP	Foreign Trade	Foreign Aid
1983	10%	0%	12%	16%	20%
1984	13%	2%	14%	10%	23%
1985	15%	0%	52%	28%	5%
1986	16%	5%	18%	18%	37%
1987	19%	3%	18%	12%	9%
1988	32%	15%	19%	29%	48%
1989	9%	-1%	17%	14%	25%
1990	16%	2%	14%	15%	8%
1991	12%	2%	21%	30%	6%
1992	21%	-9%	23%	49%	0%
1993	18%	5%	22%	24%	27%
1994	32%	5%	16%	25%	8%
1995	28%	6%	11%	15%	-3%
1996	10%	0%	14%	16%	27%
1997	13%	7%	13%	23%	5%
1998	6%	-3%	13%	0%	9%
1999	11%	1%	12%	6%	-2%
2000	15%	7%	12%	29%	8%
2001	17%	7%	38%	8%	7%
2002	1%	-2%	2%	-10%	-23%
2003	4%	3%	9%	13%	10%
2004	18%	12%	11%	9%	19%
2005	12%	12%	12%	9%	25%
2006	6%	7%	16%	12%	-7%
2007	24%	17%	14%	9%	17%
2008	20%	20%	13%	11%	13%
2009	37%	1%	20%	25%	24%
2010	37%	23%	17%	24%	37%
2011	11%	34%	36%	6%	17%
2012	19%	-1%	13%	16%	-11%
2013	23%	1%	14%	18%	-9%
2014	20%	1%	17%	27%	28%
2015	14%	6%	11%	7%	6%
2016	18%	2%	10%	-2%	16%
2017	31%	17%	20%	26%	22%
2018	19%	13%	13%	25%	46%
2019	12%	2%	13%	14%	12%
2020	-5%	-3%	3%	-15%	-5%
2021	24%	9%	12%	30%	49%