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Analysis of Political-Administrative and Economic Determinants of Public Revenue: Evidence from Pakistan

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Abstract
Objective: This research intended to identify the economic and political determinants of public revenue in Pakistan.
Research Gap: This study aims to explore the determinants of tax revenue in Pakistan, with a focus on identifying the key factors and variables that influence and affect tax collection and proposing potential solutions to improve the tax system.
Methodology: It employed TSD from 1980 to 2024. The study employed the Augmented Dickey-Fuller Test, Autoregressive Distributive Lag model, and Error correction Model for the analysis of the data.
The Main Findings: The results for determinants of tax revenue showed that agriculture output, Fiscal Decentralization, Political Stability and Public Expenditure has positive impact on tax revenue. The inflation and unemployment has inverse impact on the tax revenue. The manufacturing value added and GDP has a lagged structure relationship with tax revenue having negative relationship in current time and positive in lagged time.
Practical implication of the Findings: This study suggested that to enhance Productive Government Expenditure Govt should redirect public spending towards growth-stimulating sectors like infrastructure, education, and health. The government should also Foster a stable political environment to build investor confidence and improve tax compliance. Implement long-term policies to support the manufacturing sector and encourage formalization. Govt should introduce presumptive taxes on agricultural income and land to address under-taxation. This study also suggested that to reduce unemployment Govt should take measures to attract FDI, focus on skills development, and initiate labor-intensive projects.

Key Words: Determinants, ARDL, Error Correction Model, political stability, Fiscal decentralization

Introduction

Pakistan economic landscape has long been shaped by the challenges of generating sufficient tax revenue to support its development goals. Despite its potential, the country has struggled to mobilize domestic resources effectively, resulting in a persistent fiscal deficit. This issue has far-reaching implications for the nation's ability to invest in essential public services, infrastructure, and human capital.

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The tax system in Pakistan has been criticized for its inefficiencies, complexities, and narrow tax base. Many experts argue that the country's tax structure is not conducive to promoting economic growth, reducing poverty, or ensuring social justice. Moreover, the tax administration has faced numerous challenges, including corruption, lack of transparency, and inadequate taxpayer education.

In recent years, the government has introduced various reforms aimed at improving tax collection, broadening the tax base, and enhancing taxpayer compliance. However, despite these efforts, the tax-to-GDP ratio in Pakistan remains relatively low compared to other developing countries. Pakistan's tax-to-GDP ratio stands at 32 percent, which is significantly lower compared to countries like Malaysia 69 percent, India 51 percent, and Thailand 40 percent (CDPR report). Another reason for low tax collection is the minimal number of taxpayers. In 2020, only about 1 percent of Pakistan's population was active taxpayers, an absolute contrast to higher percentages in countries such as Australia 88 percent, and the United States 44 percent (CDPR report). Persistent low revenue has forced the Government to borrow just to meet regular expenditures.

In FY23-24, the fiscal deficit reached 7.5 percent of GDP. However, despite these efforts, the tax-to-GDP ratio in Pakistan remains relatively low compared to other developing countries. The manufacturing sector, for instance, accounts for 16.6 percent of the country's GDP, but it pays a significant 58 percent of the direct taxes. On the other hand, the wholesale sector contributes 18 percent to GDP, but its direct tax contribution is relatively low at 4. The real estate sector is another significant player in Pakistan's economy, holding 30 of the country's wealth and accounting for 32 percent of GDP. However, its tax contribution is surprisingly low, less than 0.1 of GDP. Similarly, the agriculture sector generates around $60 billion annually, making up almost 20 of GDP, but its tax contribution is a mere 0.002 percent of total taxes. These figures highlight the need for a more effective tax collection system in Pakistan.

This study aims to explore the determinants of tax revenue in Pakistan, with a focus on identifying the key factors that influence tax collection and proposing potential solutions to improve the tax system. By examining the existing literature and empirical evidence, this research seeks to contribute to a deeper understanding of the complexities surrounding tax revenue generation in Pakistan and inform policy decisions that can help address this critical issue.

The significance of this study lies in its potential to provide insights into the challenges and opportunities facing Pakistan's tax system and to offer recommendations for policymakers, tax administrators, and other stakeholders. By adopting a nuanced and evidence-based approach, this research aims to promote a more informed discussion about tax reform in Pakistan and contribute to developing a more equitable, efficient, and effective tax system.

The fundamental objective of taxation is to generate revenue that supports government spending, while also helping to shape economic behavior and promote a more equitable distribution of wealth. Jhingan (2004) taxation serves

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not only as a financial tool but also as a mechanism for economic management. Anyanwu (1993) outlines three core purposes of taxes: funding public services, regulating economic activity, and influencing income and employment levels. Gupta et al. (2022) weak states have significantly lower short-term tax buoyancy, which can be attributed to institutional weaknesses.

According to Ojong et al. (2016), the way taxes are structured plays a role not only in distributing economic demand among individuals but also in maintaining economic stability. Taxes help promote employment, control inflation, and support economic growth, all while balancing trade and international payments. Nwezeaku (2005) points out, that how effectively these goals are met depends on the political and economic mindset of citizens, their aspirations, and their willingness to contribute through taxes. Ultimately, a government's ability to fulfill its functions relies heavily on the strength of its tax system and the level of public cooperation and commitment.

Tanzi (1989) also found that imports and foreign debt were positively related to tax revenue, whereas income levels had no significant impact. Teera and Hudson (2004) highlighted that tax performance analyses yield more reliable results when countries are grouped by income level or geographic region. Chaudhry and Munir (2010) identified that narrow tax bases, a predominant agricultural sector, and low literacy rates adversely affect tax revenue in Pakistan. Their study emphasized that broadening the tax base and enhancing political stability could significantly improve tax collection. Amin et al. (2014) highlighted the detrimental effects of corruption and political instability on tax collection. Their empirical investigation revealed that while trade openness and real per capita income positively influence tax revenues, factors like corruption and inflation have the opposite effect.

Boukbech et al. (2018) investigate the determinants of tax effort and they find that inflation and public spending have significant and positive effects, while public aid received and foreign debt show a significantly negative relationship with tax effort. Begum (2007) identifies Factors such as broad money supply, external debt, population growth, and international trade were found to significantly influence tax efforts.

Economic and Political Determinants:
Many economic and Political variables may affect revenue and expenditure. The literature has identified the following important variables that might affect revenue and expenditure. AL-Qudah's (2021) analysis results revealed that per capita GDP, fiscal deficit, and government expenditure have a positive significant impact on tax revenues in the short run and long run. While Foreign aid has a negative significant impact on tax revenues. Industrial sector Value added and economic openness have a positive significant impact in the short run while having a positive insignificant impact on tax revenues in the long run. The results explore that per capita GDP, fiscal deficit, foreign aid, and government expenditure are good determinants for tax revenues in the short run as well as in the long run, while industrial sector value added and economic openness are good determinants in the short run.

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Gobachew et al. (2021) found that the industry sector share of GDP, Per capita income, and trade openness had a significant positive effect on tax revenue, while the agriculture sector share of GDP and annual rate of inflation had a significant negative effect. These factors collectively influenced tax revenue generation in the past. Minha et al (2021) Findings showed that the openness of the economy, foreign direct investment (FDI), the ratio of foreign debt to GDP, and the share of value added in the industry to GDP had a positive impact on tax revenue. Official Development Assistance (ODA), on the other hand, hurt tax revenue. Peter et al. (2021 find that when Corporate Taxes and VAT increase, unemployment also increases. When Customs and Excise Duties increase, unemployment decreases.

Buzugbe et.al (2024) find that there is a negative relationship between TR and unemployment in the short run and a positive relationship between TR and unemployment in the long run. Ahmed and Mehmood (2010) stated that there is a lag type of relationship between the MVA and TR. Chaudhry and Munir (2010) results revealed that trade openness, broad money supply, external debt, foreign aid, and political stability significantly affect tax efforts. Conversely, a narrow tax base, heavy reliance on the agricultural sector, foreign aid dependence, and low literacy rates are identified as major contributors to low tax revenue.

Objectives

1. To investigate the impact of economic variables on tax revenue
2. To investigate the analysis of political-administrative variables on tax revenue

Significance of the Study

This study aims to explore the determinants of tax revenue in Pakistan, with a focus on identifying the key factors that influence tax collection and proposing potential solutions to improve the tax system. By examining the existing literature and empirical evidence, this research seeks to contribute to a deeper understanding of the complexities surrounding tax revenue generation in Pakistan and inform policy decisions that can help address this critical issue.

The significance of this study lies in its potential to provide insights into the challenges and facing Pakistan's tax system and to offer recommendations for policymakers, tax administrators, and other stakeholdersThis study will be a useful document for further studies on the relationship between Government revenue and expenditure in Pakistan and anywhere in the world.

Literature Reviews

Saibu and Olatunbosun (2013) examined the macroeconomic determinants of tax revenue in Nigeria. The research focuses on Nigeria, covering the period from 1970 to 2011. The main findings indicate that tax revenue is significantly responsive to changes in income level, exchange rate, and inflation rate. The study concludes that macroeconomic instability and the level of economic activities are primary drivers of tax buoyancy and tax efforts in Nigeria.

Ayenew (2016) investigates the factors influencing tax revenue in Ethiopia from 1975 to 2013, employing the Johansen co-integration approach. It finds that, over the long term, increases in per capita income, foreign aid, and industrial

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output positively impact tax revenue, while inflation has a detrimental effect. In the short term, per capita income and inflation negatively affect tax revenue, whereas industrial output continues to have a positive influence. The study suggests that enhancing per capita income growth, implementing structural reforms, introducing new tax bases, and efficiently utilizing foreign aid are crucial for improving tax administration and revenue growth in Ethiopia.

Sheikh et al. (2018) investigated the economic factors influencing tax buoyancy in Pakistan, focusing on the period from 1996 to 2016. This is important because an effective fiscal policy can significantly enhance the mobilization of resources needed for government expenditures, especially in developing countries like Pakistan, where the tax situation has historically been problematic. The findings show that there is a mixed relationship between tax buoyancy and various economic factors, indicating that some taxes are more responsive to economic changes than others. This research highlights the need for tailored fiscal policies to address the specific tax challenges in Pakistan and provides valuable insights into the relationship between economic determinants and tax revenue performance over the given period.

Motsatsi (2018) analyzes the tax performance in Botswana. They take quarterly data from 1994/95 to 2013/14, the research assesses whether Botswana is optimizing its taxable capacity through the Tax Effort Index (TEI) approach. The findings reveal that sectors such as mining, trade, and manufacturing positively impact tax revenues. Additionally, increases in GDP per capita and outstanding debt correlate with higher tax collections. Conversely, total grants exhibit a negative relationship with tax revenue, and the agricultural sector appears to have no significant effect. The study suggests that policies aimed at expanding the positively correlated sectors could enhance tax revenues. Furthermore, strengthening the capabilities of tax collectors through improved training and infrastructure could lead to more efficient tax collection processes.

Anuar (2019) explores the macroeconomic determinants of tax revenue in Malaysia. Malaysia's government has been struggling with budget deficits. This study was conducted to identify the key factors influencing tax revenue in Malaysia. The study analyzed the relationship between tax revenue and inflation rate, trade openness, exchange rate, and the value-added of the agriculture sector. The results showed that the inflation rate and exchange rate have a positive impact on tax revenue, while trade openness has a negative effect. The value-added of the agriculture sector was found to be insignificant in determining tax revenue, with a negative relationship. The study provides valuable insights for policymakers to develop effective tax policies and reduce Malaysia's reliance on budget deficits.

Awasthi (2020) examines the drivers of property tax revenue by analyzing data from countries like the United States, Canada, Australia, Chile, and members of the OECD from 2006 to 2016. It finds that as countries grow economically and their populations increase, their property tax revenues also tend to rise. On the other hand, when federal transfers go up, property tax revenue often goes down. The analysis highlights that a country’s development level, demographics, fiscal

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policies, and property tax system all play key roles in shaping how much revenue is generated from property taxes.

Chilima (2020) explores Determinants of Tax Revenue Performance in Malawi. The Study analyzes tax performance across 59 countries over two decades, focusing on how economic structures influence tax capacity and effort. The study critiques the inclusion of institutional variables such as corruption indices in measuring tax effort, arguing that these factors explain differences in tax ratios rather than tax effort itself. Instead, the authors emphasize the importance of accurately measuring tax effort based on taxable capacity.

Tarawalie and Hemore (2021) investigated the determinants of tax revenue in Sierra Leone from 1990Q1 to 2020Q1, using the ARDL estimation framework. The results suggest that real GDP, openness, and official development assistance have a positive long-term impact on tax revenue, while inflation has a negative effect in the short run. The findings emphasize the importance of fostering economic growth through investment in key sectors such as agriculture, health, education, energy, and infrastructure, along with creating a politically stable environment to encourage private sector investment.

Ihuarulam et al. (2021) investigate the relationship between macroeconomic variables and tax revenue within the Economic Community of West African States (ECOWAS). This study employs panel data analysis, using data from six ECOWAS countries over the period 2005-2019. The analysis examines variables including tax revenue, GDP, inflation, unemployment, trade openness, and exchange rates. The results showed that inflation and economic growth are positively related to tax revenue. While unemployment had a negative impact on tax revenue. Based on these findings, the authors recommend that ECOWAS countries focus on managing their macroeconomic environment effectively to boost tax revenue. This includes leveraging inflation and economic growth while addressing the negative impact of unemployment.

Amoh and Adom (2021) explore the key factors that influence tax revenue growth in Ghana. They identify several crucial elements like foreign direct investment (FDI), the value added by manufacturing and services, external debt, and government spending. Their findings show that the estimated tax revenues tend to be higher than what the government collects, leading to a consistent shortfall, with tax revenue gaps averaging about 10.27 percent of GDP annually. This indicates that there are significant inefficiencies in tax collection. The authors argue that to meet the Sustainable Development Goals (SDGs), Ghana needs to simplify its tax system and focus on the key drivers that can truly boost tax revenue growth.

Prowd and Kollie (2021) investigate the factors influencing tax revenue performance in Liberia. The findings indicate that, in the long run, tax revenue responds positively to variables such as real property, income and profit, property income, goods and services tax, administrative fees, import duties, excise tax, grants, loans, inflation, and GDP growth. Conversely, it responds negatively to social development contributions from agriculture and mining, real

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exchange rate, and population growth. This study recommends Liberia mitigate the over-reliance on direct taxes by adopting a Value-Added Tax (VAT) regime in place of the current Goods and Services Tax (GST) system.

Piancastelli and Thirlwall (2021) examine the determinants of tax revenue and tax effort in 59 developed and developing countries from 1996 to 2015. The results show a range of tax efforts, with South Africa having the highest effort and Switzerland having the lowest. The paper critiques studies that include institutional variables to measure tax effort, arguing that these variables explain differences in tax ratios rather than tax effort itself. The findings have policy implications, emphasizing the importance of accurately measuring tax efforts based on taxable capacity.

Tanchev (2022) examines the determinants of proportional income tax revenue in Russia and Bulgaria, focusing on the differences between the two countries' tax systems. The study concludes that in Russia, a higher gross disposable income and the higher marginal tax rate of the proportional income tax with a non-taxable minimum result in more revenue. In contrast, in Bulgaria, a lower marginal tax rate of the proportional income tax without a non-taxable minimum correlates with less revenue, even when employment increases. Based on the findings, the article suggests that a proportional income tax system with a non-taxable minimum is more effective in generating revenue than a pure flat tax system without one. This study provides valuable insights for policymakers in countries considering the introduction or modification of proportional income tax systems, especially those aiming to optimize tax revenue through macroeconomic variables.

Theoretical Framework and Econometric Methodology

Tanzi effect explains how high inflation can negatively impact real tax revenue. It was named after economists Vito Tanzi and Julio Olivera in 1977. The main idea is that inflation erodes the real value of tax collections due to the time lag between tax announcement and tax collection. Inflation reduces the real value of tax payments received by the Government. As prices rise, the real value (purchasing power) of the tax revenue collected by the government decreases, even if the nominal amount remains the same.

Douglass North (1992) explained that strong systems like laws, government rules, and stable leadership and political stability help a country grow. When there is political stability, these systems work better. People and businesses feel safe to invest and follow rules. This increases trust in the government and encourages people to pay taxes honestly.

The theory of Fiscal Federalism was developed by Richard Musgrave and later expanded by Wallace Oates, provides a framework for understanding how different levels of government (central, state, and local) manage and distribute fiscal responsibilities and revenues. Fiscal decentralization can enhance revenue generation at the local level. Local governments can implement and collect their taxes, leading to a more diversified and stable revenue base.

Okun law (1963) the relationship between unemployment and economic growth, stating that for every 1 percent increase in unemployment, the GDP percent will fall by approximately 2 percent When GDP is decreased it leads to decrease in tax

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base. Which further causes to decrease in TR. Conversely, a 1decrease in unemployment is associated with a 2-3 percent increase in GDP.

Lotz and Morss (1967) explain that as an economy industrializes, its tax capacity increases due to better income tracking, formalization, and monetization. In the short run, however, manufacturing sectors in developing countries like Pakistan often receive tax incentives, subsidies, or informal operations leading to a negative relationship with tax revenue. In the long run, as manufacturing becomes more formalized and efficient, and tax policies mature, it starts contributing positively to revenue reflecting increased tax capacity.

Tax base and tax handle theory

The tax base and tax handle theory proposed by Tanzi (1993) explains that Countries with low GDP per capita often have narrow tax bases. Their economies may be dominated by agriculture and informal sectors, which are difficult to tax.

Variables of the Study

Table:1: Economic and Political Administrative Determinants of Tax Revenue

S/ No	Variables	Abbr..	Measurement	Expected outcomes	Period	Source of data
01	GDP	GDP	Million PKR	Positive	1990-2024	SBP
02	Unemployment	U	Percentage of labor	Negative	1990-2024	WDI
03	Inflation	II	GDP deflator	Negative	1990-2024	WDI
04	Manufacturing value added	MVA	Percentage of GDP	Negative	1990-2024	WDI
05	Agriculture value added	AVA	Percentage of GDP	Positive	1990-2024	WDI
06	Fiscal Decentralization	FD	Dummy variable	Negative	1990-2024	Dummy Variable
07	Political Stability	PS	2.5 to -2.5	Positive	1990-2024	WGI
08	Govt Expenditure	GE	Million PKR	Positive	1990-2024	SBP

In this research dependent variable of the study is Tax revenue whereas gross domestic product, unemployment, inflation, manufacturing value added, agriculture value added, fiscal decentralization, and political stability are independent variables.

$$TR = GDP, U, \pi, MVA, AVA, FD, PS, GE$$

TR is the tax revenue, which is the function of social and institutional

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determinants.
Tax revenue (TR)= F(Gross Domestic Product, Unemployment, Inflation, Manufacturing Value Added, Agriculture Value Added, Fiscal Decentralization, Political Stability, Govt Expenditure.

Econometric Technique and Research Methodology

In the first step of econometric methodology, this study will employ the Autoregressive Distributed Lag Model (ARDL). For ARDL the variables should be stationary of mixed order, some should be non-stationary at the level and others should be stationary at 1st difference, I (1). While the dependent variable should be stationary at level I (0). The existence of ARDL-type co-integration is further verified by using ARDL bound test. The lag length or order of the ARDL is determined by using various criteria like SBC and AIC. The following ARDL model is employed in this study.

$$Tax\ revenue = \beta\circ + \beta_1 GDP + +\beta_2\ U + \beta_3\ \pi + \beta_4\ MVA\ + \beta_5\ AVA + \beta_6\ FD + \beta_7\ PS + \beta_8\ GE + \mu 1$$

Data Sources

This research study used the TSD from 1980 to 2024. The Eviews 10 was used for the data analysis. The data was retrieved from the State Bank, world Governance Indicators, and World Development Indicators.

Data Analysis and Interpretation

Table:2 Results of Causality test for MVA and tax revenue:

Null Hypothesis	Observations	F-Statistic	Probability
MVA does not Granger Cause TR	43	28.1294	3.E-08
TR does not Granger Cause MVA	43	7.55366	0.0017

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The p-value is 3.E-08 (or 0.00000003), which is significantly less than 0.05. The p-value is 0.0017, also less than 0.05. This indicates that past values of TR help to predict MVA value. An increase in manufacturing value added can lead to higher total revenue through several channels.
When the manufacturing sector grows, it boosts overall economic activity by increasing production and consumption. This growth creates more employment opportunities, which raises household income and spending, resulting in higher income and sales tax collections. As manufacturing firms expand, they also contribute more to corporate taxes.

Tablele:3 Results of Causality Test For GDP and GE:

Null Hypothesis	Observation	F- Statistic	Probability
GDP does not granger cause GE	43	0.43306	0.6517
GE does not granger cause GDP	43	8.09832	0.0012

Source: Author's estimation

Augmented Dickey-Fuller Test
Table: 3 Results of ADF Tests

S.No	Name	ADF	Test value	Critical value	P-value	Results
01	Agriculture Value Added	Level	-3.591653	-3.523623	0.0430	***I* (0)**
		1st	-	-3.520787	0.0000	
02	Manufacturing Value Added	Level	-2.024544	-3.515523	0.5720	***I (1)***
		1st difference	-6.204608	-3.518090	0.0000	
03	GDP	Level	4.815139	-3.544284	1.0000	***I* (1)**
		1st difference	-9.208728	-3.520787	0.0000	
04	Fiscal Decentralization	Level	-2.018586	-3.515523	0.5752	***I* (1)**
		1st difference	-6.527816	-3.518090	0.0000	
05	Inflation	Level	-5.974389	-3.515523	0.0001	***I* (0)**
		1st difference	-7.686885	-2.933158	0.0000	
06	Unemployment	Level	-2.197146	-3.515523	0.4793	***I* (1)**

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		1st difference	-6.882818	-3.518090	0.0000	
07	Political stability	Level	-0.000726	-3.515523	0.9950	***I* (1)**
		1st difference	-4.521480	-3.518090	0.0040	
08	Tax Revenue	Level	-1.140710	-2.933158	0.6907	***I* (1)**
		1st difference	-7.898282	-2.933158	0.0000	
09	Government Expenditure	Level	-2.279123	-3.515523	0.4360	***I* (1)**
		1st difference	-6.119237	-3.520787	0.0000	

This test is employed to assess the stationarity of the data to ascertain the type of econometric model to be employed on the data. The ADF test employe the tau statistic to assess the unit root. The null hypothesis of ADF is that data is non-stationary. If the tau calculated is more negative than the critical value tau reject Ho otherwise accept Ho. Again if the p-value is less than 0.05 then reject Ho and the data will be stationary otherwise accept Ho and the data will be nonstationary.
The ADF test results showed that variables were integrated in different order, some variables were integrated at level *I* (0) and some variables were integrated at first difference, *I* (1). Agriculture Value Added and inflation were integrated at level, *I* (0). While other variables were non-stationary at level and stationary at first difference, *I* (1). The results were indicating the use of Autoregressive Distributive Lag Model (ARDL).

Bound Test of Co- Integration

The bound test is employed to confirm the prevalence of the ARDL type of co-integration among the variables. The Null Hypothesis of the bound test is there is no ARDL type of co-integration. If the F-static value is greater than the upper bound the Ho will be rejected and there will prevail the co-integration.

Table: 4 Results of Bound Test

Test Statistics	Statistics value	Level of significance	Lower Bound	Upper Bound	Results
F-Statistics	5.343326	10 %	2.13	3.09	ARDL co-Integration exists

Source: Author's own estimation

The result of the Bound test has verified the presence of ARDL-type Co-integration among the variables. The F-calculated was greater than the upper bound. The results have rejected the Null Hypothesis of the non-existence of the ARDL co-integration.

Long-run analysis of Tax revenue and its determinants

Testing the Order of the ARDL

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The Akaike Information Criterion (AIC) is used to select the best-fitting model among alternatives. Lower AIC indicates a Better model. The lowest AIC is around 1.88, which belongs to the first model. The optimal lag length identified by the AIC for the ARDL model is 110100110 as shown by the following AIC graph.

AIC Lag Selection Test

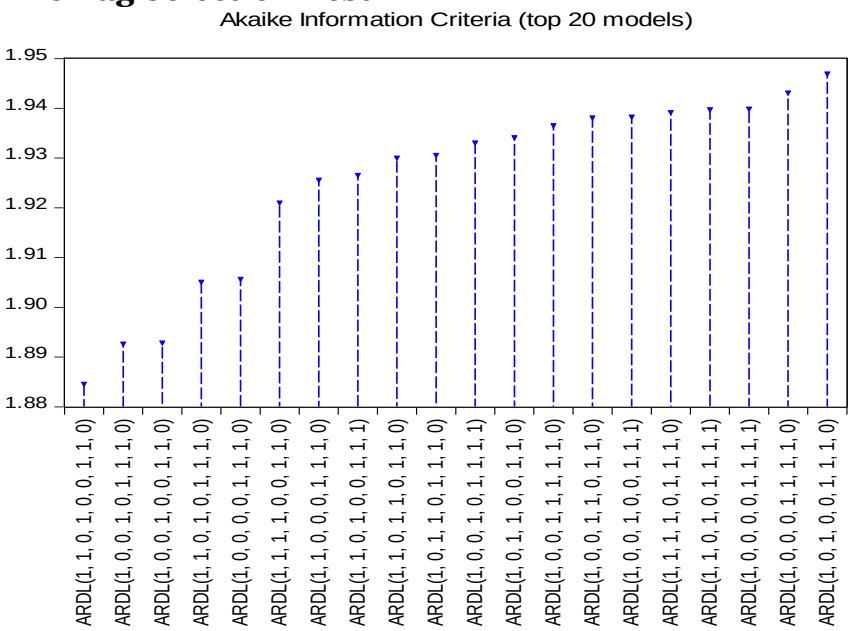

Figure: 2 Results of the AIC test

Table: 5 Long Run Analysis of Tax revenue and its determinants:

S.No	Variables	Coefficients	p-value	Remarks
01	Tax Revenue(-1)	0.729847	0.0000	
02	Agriculture Value Added	0.134680	0.2122	
03	Manufacturing Value Added	-0.176908	0.2255	
04	Manufacturing Value Added(-1)	0.2575187	0.0420	
05	GDP	-2.75E-05	0.0000	
06	GDP(-1)	2.30E-08	0.0000	
07	Fiscal Decentralization	0.653067	0.3488	
08	Fiscal decentralization(-1)	-1.521499	0.0286	

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09	Inflation	-0.086527	0.0000	
10	Unemployment	-0.010407	0.0387	
11	Unemployment(-1)	-0.102513	0.02159	
12	Political stability	1.121602	0.0296	
13	Government Expenditure	0.076343	0.0354	
14	Constant	8.243617	0.1143	

Source: Author own estimation

A one percent increase in Total revenue as a percent of GDP in the lag period would lead to an approximately 0.73 percent increase in TR. The coefficient is statistically significant at the 5 percent level of significance. There is a strong and significant lag effect of Total Revenue, suggesting that current revenue is heavily influenced by its past values. Jones's (2015) results justify that total revenue leads to an increase in TR. This pattern is explained by theories such as Peacock-Wiseman's Displacement Theory.

A one percent increase in unemployment will decrease total revenue as a percent of GDP by 0.0104. There is a statistically significant relationship between unemployment and TR. These results negate the findings of Peter et al. (2021), who find that when Corporate Taxes and VAT increase, unemployment also increases. Meanwhile, When Customs and Excise Duties increase, unemployment decreases. The results validate the conclusion of Buzugbe et. al (2024) where they find that there is a negative relationship between TR and unemployment in the short run and while positive relationship between TR and unemployment in the long run. This relationship is also explained by Okun law states that when unemployment increases as a result there is a 2 percent decrease in GDP. When GDP is decreased it leads to a decrease in tax base. Which further causes to decrease in TR.

A one-point Increase in political stability leads to 1 point increase in TR. A coefficient is statistically significant at a 5 percent level of significance (coefficient: 1.121602, p-value: 0.0296). Results of Estrada, et.al (2011) find that the Taxation and political stability response of PS to PS is positive throughout the period. Response of GE to PS, GE, FC, and GDP is positive while it is negative for Tax. Institutional and Economic Theory, given by Douglass North(1992), says that strong systems like laws, government rules, and stable leadership and political stability help a country grow.

There is no significant short-run relationship between manufacturing value added and TR. The results validate the conclusion of Ahmed and Mehmood (2012) who stated that there is a lag type of relationship between the MVA and TR. It decreases the TR in the current time while increasing in lag time. At the current time to increase the MVA goods gives tax rebates and subsidies which decreases the TR. These results contradicted the results of Eltony (2012). Tax capacity theory proposed by Lotz and Morss (1967) posits that a country's ability to generate tax revenue is influenced by its level of economic development and structural characteristics. They

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argued that as economies grow and modernize, their capacity to collect taxes increases due to factors like improved administrative systems, broader tax bases, and higher income levels.

A one percent increase in the inflation as GDP deflator leads to a decrease of approximately 0.0865 units in TR (Total Revenue as a percent of GDP). The results validate the conclusion of Nalyanya et. al(2020) where they find that there is a negative relationship between TR and inflation. Pyvavar (2023) results contradict that there is a positive connection between the TR and inflation. Tanzi Effect explains how high inflation can negatively impact real TR. The main idea is that inflation erodes the real value of tax collections due to delays between income earned and taxes paid.

A one percent increase in government expenditure (as a percent of GDP) leads to a 0.03 percent rise in TR statistically significant relationship between government expenditure and TR and statistically significant at 5 percent of significance. Theory explains the connection between government expenditure and TR are spend revenue hypothesis. Mele et al. 2020 results sustain the spend-and-tax hypothesis that an increase in Government spending would raise taxes.

For every 1 million PKR increase in GDP, leads to a 0.0000275 increase in tax as a percent of GDP. The p-values are statistically significant at a 5 percent level. Dahal (2020) results also confirm that there is a positive relationship between GDP and TR. Gurdal (2021) disproves the results and shows a negative relation between TR and economic growth. The tax base and tax handle theory proposed by Tanzi (1993) explains that Countries with low GDP per capita often have narrow tax bases. Their economies may be dominated by agriculture and informal sectors, which are difficult to tax. A one million PKR increase in GDP from the previous period leads to an increase of approximately 0.0230 PKR in the TR. This relationship is also validated by Shahzada and Mughal (2024).

If fiscal decentralization occurs in the current year, total revenue (TR) increases by 0.65, but this effect is not statistically significant. So, currently, decentralization has no clear effect on TR. Ebel and Yilmaz (2002) also validate that there is a negative relation between FD and TR.

If decentralization occurred one year ago, then it is associated with a decrease in total revenue by 1.52 units, and this effect is statistically significant. Fiscal decentralization (lag) may have negative consequences on revenue due to adjustment costs, mismanagement, or inefficiencies at local levels after the policy shift. The theory of Fiscal Federalism was developed by Richard Musgrave and later expanded by Wallace Oates, provides a framework for understanding how different levels of government(central, state, and local) manage and distribute fiscal responsibilities and revenues. Fiscal decentralization can enhance revenue generation at the local level. Local governments can implement and collect their taxes, leading to a more diversified and stable revenue base.

The coefficient 0.1347 means that a 1 increase in the agriculture value added as a percent of GDP is associated with an increase of 0.1347 percent in TR. This relationship is not statistically significant at the 5 percent level (0.0321). Hamdan and Rana (2021) results show that agriculture growth has a negative relationship with tax revenue in Pakistan. Tax base and tax handle theory proposed by Tanzi's

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(1993) explains that Countries with low GDP per capita often have narrow tax bases. Their economies may be dominated by agriculture and informal sectors, which are difficult to tax.

Diagnostic Test of Long Run

Table: 6 Diagnostic Test of Long Run:

S.No	Test Type	Null Hypothesis	Test Statistics	P-Values	Results
01	R-Squared		0.97052		
02	F-Test	The model is overall	54.1229	0.0000	
03	Breush-Pagan – Godfrey	No Hetro-ccedasticity	15.75099	0.3288	
04	Breush-Godfrey	No Autocorrelation	4.871831	0.0875	

Source: Author own estimation

A total of 97 percent of the variations were explained as shown by R-square. The F-statistic exposed that the model was overall significant. Breusch-Pagan-Godfrey calculated test indicates that there was no heteroscedasticity. Breusch-Godfrey statistics quantified that there was no autocorrelation.

4.8. Jarque-Bera Test of Normality :

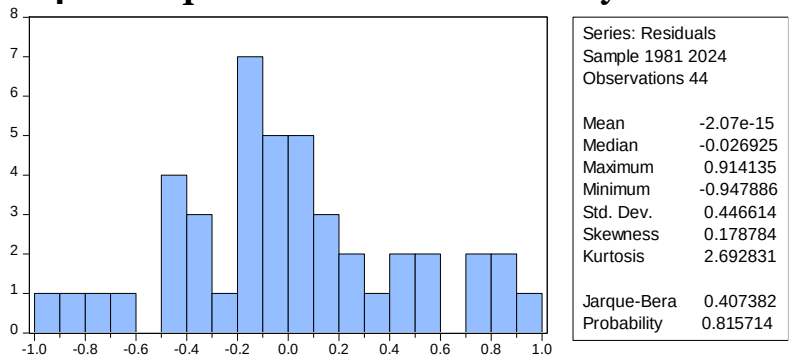

Figure: 3 Results of the JB Test

The JB Test was used to check the model specification errors. It followed the χ2 distribution. The JB statistics p-value was 0.815, which showed that residuals were normally distributed because the p-value is greater than 0.05, so we reject the null hypothesis. Also, the model was correctly specified.

CUSUM Test

The CUSUM test was used to check the stability of the model. The blue line was inside the red lines and the model was stable.

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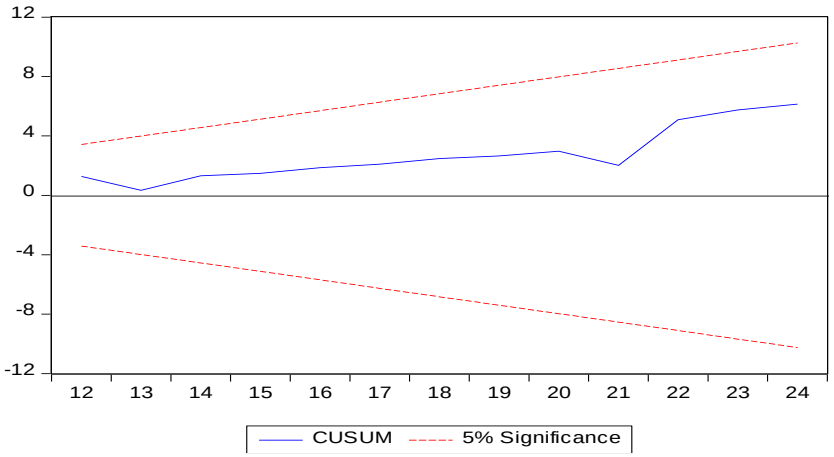

Figure: 4 Results of the CUSUM Test

Short Run Analysis of Tax revenue and its determinants

The short-run nexus between the tax revenue and its determinants was captured through the Error Correction Model.

Table: 7 Short Run Analysis of Tax revenue and its determinants

S.No	Variables	Coefficients	p-value	Remarks
01	Agriculture Value Added	-0.053519	0.6797	
02	Manufacturing Value Added	0.263591	0.0590	
03	GDP	-2.79E-08	0.0000	
04	Fiscal Decentralization	0.551855	0.4701	
05	Inflation	-0.024323	0.0163	
06	Unemployment	-0.025027	0.7638	
07	Political stability	0.690916	0.3977	
08	Government Expenditure	0.040356	0.4893	
09	C	0.002899	0.9799	
10	Error Correction Coefficient	-0.674407	0.0144	

Source: Author's own estimation

Manufacturing Value Added, Fiscal Decentralization, Political stability and Government Expenditure have direct and positive impact on tax revenue. Which is according to economic theory. While Agriculture Value Added, GDP, and Inflation have a negative relation with tax revenue. The ECM factor value was 0.47, which stated that any deviation from the co-integrated equilibrium path

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would be corrected in about a two-year time.

4.11 Diagnostic Test of Short Run

Table: 8 Diagnostic Test of Short Run:

S.No	Test Type	Null Hypothesis	Test Statistics	P-Values	Results
01	R-Squared		0.936552		
02	F-Test	Model is overall insignificant	54.12200		
03	Breush PaganGodfrey	No Hetro ccedasticity	14.97195	0.0917	

Source: Author own estimation

The total 93 percent of the variations were explained as shown by R-square. The F-statistic revealed that the model was overall significant. Breusch-Pagan-Godfrey calculated test showed that there was no heteroscedasticity. Breusch-Godfrey statistics showed that there was no autocorrelation.

CUSUM Test of Structural Stability:

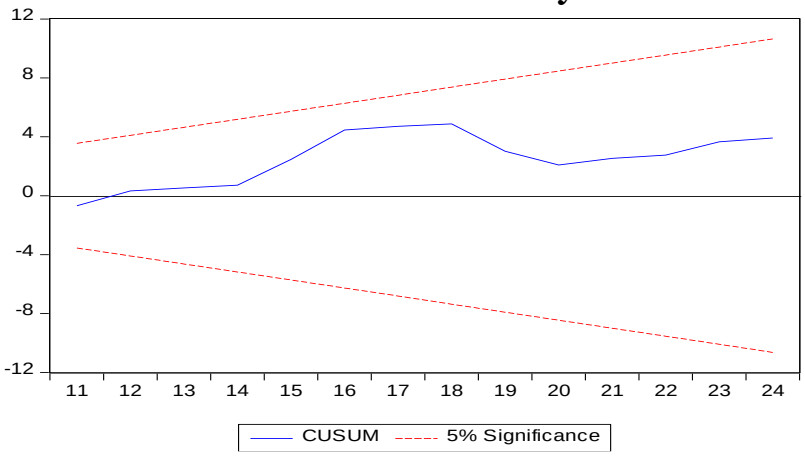

Figure:6 Result of CUSUM Test of Structural Stability:

The CUSUM test explained that the blue line was inside the red lines and the model was stable.

Jarque-Bera Test of Normality for Short Run:

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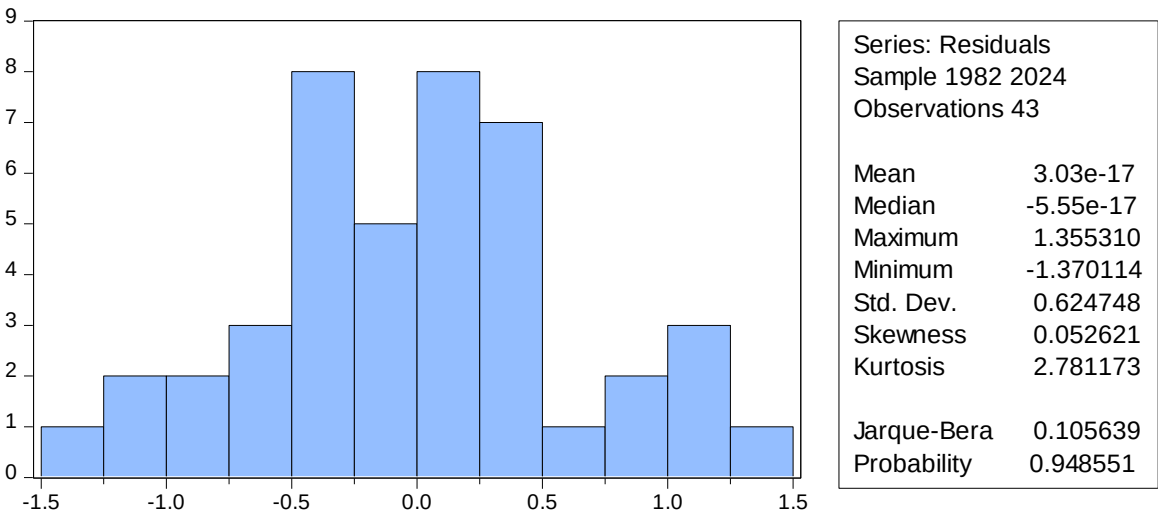

Figure: 5 Results of the JB Test

Conclusion and Recommendations

Conclusion

This study intended to explore the hypothesis of revenue-spend nexus. Moreover, this study also intended to explore the quantitative relationship between tax revenue and its handles. Time series data were taken from 1980 to 2024. This study employed the econometric technique which is the Granger causality test, Augmented Dickey-Fuller test, Auto Regressive Distributive Lag model, and Error Correction Model. Based on the analysis of the study, the results provide evidence supporting the existence of the Fiscal Synchronization Hypothesis in Pakistan. The study revealed that: Agriculture Value Added, Manufacturing Value Added, GDP, Political stability, and Government Expenditure have a direct impact on tax revenue. While Fiscal Decentralization, Inflation, and Unemployment have an inverse impact on the tax revenue.

Recommendations

This study suggested that to enhance Productive Government Expenditure Govt should redirect public spending towards growth-stimulating sectors like infrastructure, education, and health. The government should also Foster a stable political environment to build investor confidence and improve tax compliance. Implement long-term policies to support the manufacturing sector and encourage formalization. Govt should introduce presumptive taxes on agricultural income and land to address under-taxation. This study also suggested that to reduce unemployment Govt should take measures to attract FDI, focus on skills development, and initiate labor-intensive projects.

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