DOI: 10.52131/pjhss.2024.v12i2.2157

Pakistan Journal of Humanities and Social Sciences

Volume 12, Number 02, 2024, Pages 1057–1071
Journal Homepage:
https://journals.internationalrasd.org/index.php/pjhss

Budget Deficits in Pakistan: A Time Series Analysis of The Impact of Economic Political and Institutional Factors

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ARTICLE INFO

Article History:
Received: April 16, 2024
Revised: May 13, 2024
Accepted: May 15, 2024
Available Online: May 19, 2024

Keywords:
Budget Deficit
Government Spending
Political Economy
Inflation
Debt Servicing

Funding:
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

This article aims to provide a thorough empirical examination of the budget deficit of Pakistan, spanning a period of four decades from 1976 to 2023. In order to fulfill the objective of the study, a wide range of economic, political, and institutional variables have been extensively examined. The ARDL technique to cointegration has been employed due to the time series structure of the variables. The objective of this article is to examine the long-term correlation between the budget deficit and its several drivers, such as inflation, debt services, economic expansion, and government size. The study's findings offer important insight into the dynamic connections between the budget deficit and its different determining factors. In Pakistan, inflation has become a major and harmful factor contributing to the budget deficit. The data demonstrates that a continuous increase in prices has resulted in a higher budget deficit. Furthermore, empirical evidence indicates that a significant portion of the deficit that exists is attributed to debt servicing charges. This highlights the importance of implementing effective regulations to control debt. Economic development exerts a positive and major impact on the management of budget deficit. In the case of Pakistan, a higher growth rate is correlated with a lower budget deficit. Moreover, this size of government has an adverse impact on the budget deficit. This demonstrates the necessity for the effective management of public finances. Corruption has an insignificant impact on the increase of the budget deficit in Pakistan. Moreover, the relationship between the political variables and budget deficit is not significant. The study fails to identify the relationship between the elections and democratic processes. This finding is unanticipated and the cause of rejection of one of the main hypothesis of the study. This may be attributed to the fact that the concerns of the political factors may be comparatively minor as compared to the economic ones. Keeping in view the findings of the current study and the previously mentioned variables, therefore this study provides an important insight into the dynamic relationship between the budget deficit and others economic, institutional and political factors. The findings of this study has generated fresh avenues for the future research, especially for the examinations of the impact of political factors because, this hypothesis has been rejected in our study.

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1. Introduction

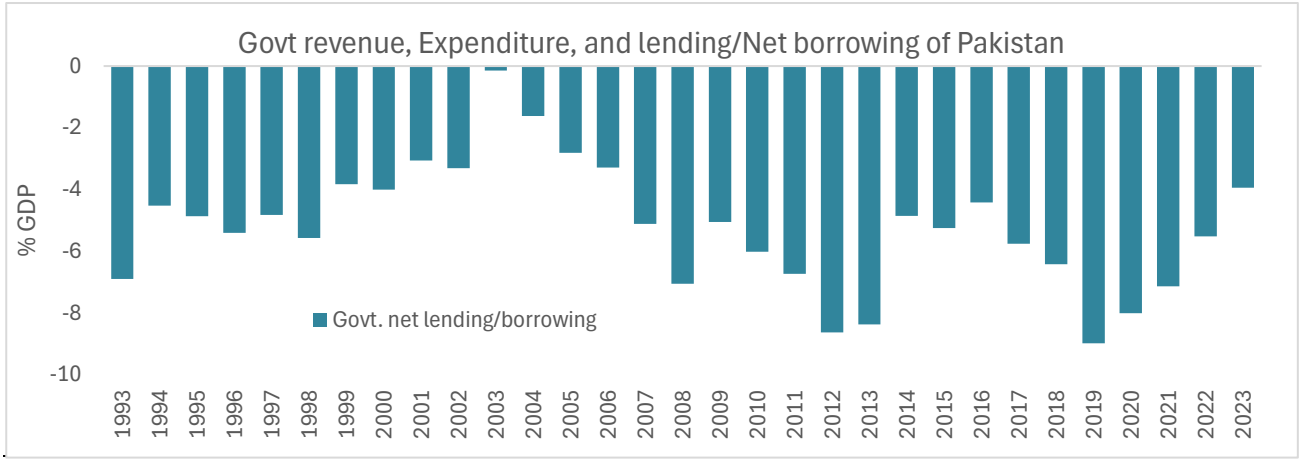
Pakistan has experienced the problem of fiscal deficit over the last four decades the reasons behind it were poor governance, corruption, and political inability to properly utilize resources to its best use. The prevailing tax structure in Pakistan fails to generate proper

revenue generation however the current government is making improvements in it. The economy of Pakistan has faced thirty-three years of autocracy and thirty-eight years of mixed democracy approximately. Therefore, the study intends to examine political factors also as they can have a major influence. Fiscal policy considerably impacts economic conditions through various measures like taxation, public borrowing, and public expenditure. The execution of these fiscal measures determines the allocation and distribution of resources along with the stabilization and development of the economy. The global economic crises in 2008-09, badly exaggerated the world except emerging economies because of their reverberation fiscal policy. European Union was one of those who recovered from its weak global economic conditions after the middle of 2012 due to Fiscal sustainability development like the Maastricht treaty. Therefore, reverberation fiscal policy plays an important role to control for the budget deficit. Under the IMF standby arrangement program government was able to successfully decrease fiscal deficit from 7.3 % in 2007-08 to 5.2% in 2008-09 but in 2010-11 increased spending in floods, heavy rains, terrorism, subsidies in the electricity sector, administration weaknesses and less revenue generation or structural deficiencies in tax system rose fiscal deficit to 6.5%.[1] Pakistan's economy was not directly affected by global financial crises but the above-mentioned issues were not properly managed i.e. expenditures were not planned properly on account of which high interest was paid on heavy borrowing from internal and external resources. During these years government settled some of the outstanding debt amounts which helped save future savings on interest payment efforts.

To attain economic efficiency and to ensure the financial autonomy of provinces as well as resource distribution, the federal government started fiscal decentralization which was named as National Finance Commission (NFC) award. The distribution of resources is based on area population, revenue generation, and poverty in provinces. The most effective way to enhance country resource mobilization is to build a better structure of the tax system. In fiscal year 2013-14 government took various measures to enhance the tax system by incorporating 300,000 new taxpayers and improving administrative initiatives. According to the IMF Pakistan did not perform as poorly as it should have during the 1980 to 1997 fiscal deficit, The reasons behind it were the government of Pakistan borrowed at a rate below the marginal cost of funds in the international private capital market, a high rate of growth of real output and high equilibrium deficit.[2] According to (Chaudhary & Abe, 1999) Budget deficit is responsible for high inflation and low growth whereas the rise in public debt may lead to inefficient allocation of resources. Pakistan's current fiscal balance improved considerably in the year 2013-14 as compared to 2012-13. Pakistan's current Budget deficit stands at 5.5 percent of GDP (SBP) which is lower than the 8.2 percent of the previous year.

Figure 1 depicts the budget deficit situation in Pakistan, we can see that Pakistan is continuously facing a deficit from 1976 to 2023. In 1976 it was at its peak while in the year 2004 and around it, the deficit was minimal as compared to other years. The graph in Figure 2 depicts that as government expenditures increase deficit also increases side by side.

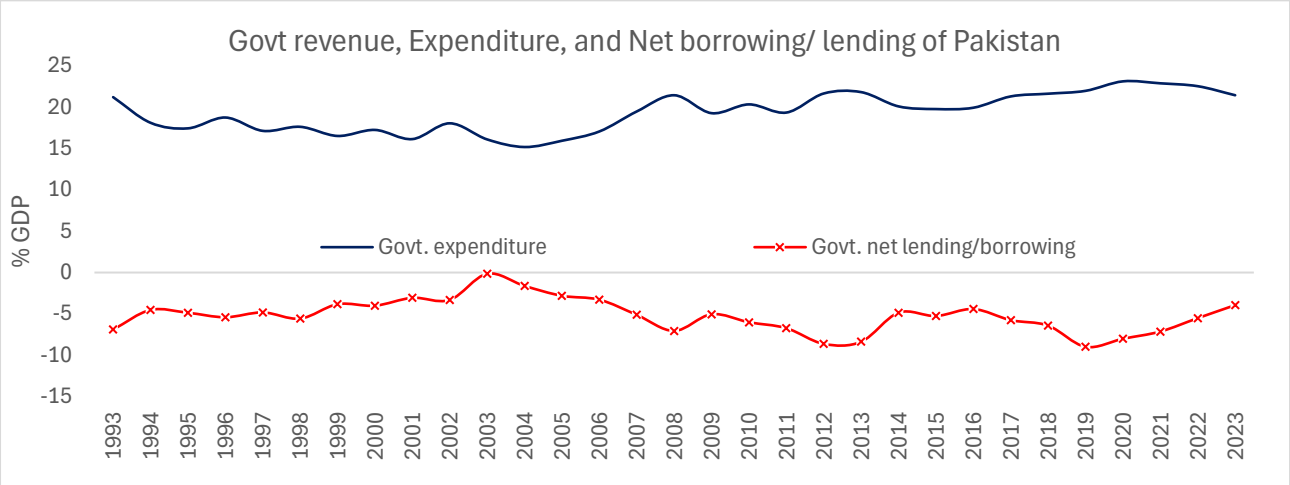
Figure 1: Budget Deficit of Pakistan, Source: Economic Survey of Pakistan various issues



[1] Economic Survey (2012-13)
[2] Zaidi (2005).

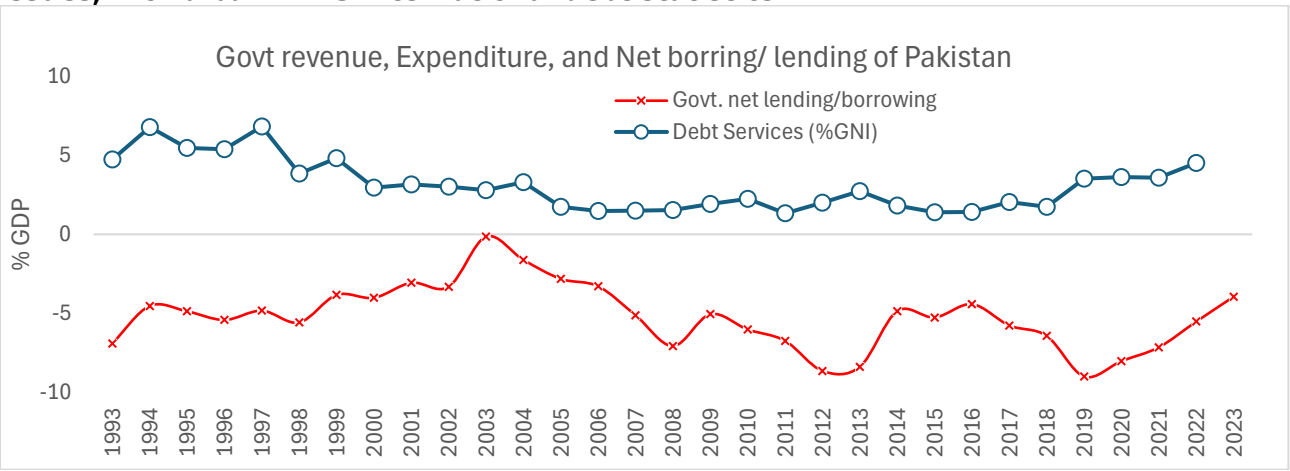
Figure 3 depicts that when the deficit decreased after 1976 debt servicing remained stable except in 1981 where it increased a little bit. Then we can see that after 1995 when the deficit decreased debt servicing also decreased while after 2005 increase in deficit decreased debt servicing and after 2012 decrease in deficit increased debt servicing while after 2014 deficit was flat while debt servicing decreased so overall there is mix type of phenomenon.

Figure 2: Budget Deficit versus Government size, Source: Economic Survey of Pakistan's various issues



Exploring the budget deficit from the perspective of economic, institutional, and political factors is important due to the diverse and sometimes conflicting findings in existing literature. Several studies, such as Onyango (2013) and Kalim and Hassan (2013), have emphasized the role of debt in driving fiscal deficits, with the latter specifically focusing on debt servicing. However, Anwar and Ahmad (2012) found a negative long-run relationship between the budget deficit (BD) and economic growth measured by the GDP, contrasting with the findings of Kalim and Hassan (2013). Inflation has also been studied as a factor influencing deficits, with Diokno (2007); Jalil, Tariq, and Bibi (2014) presenting differing views on its impact. Tiwari A. and Tiwari A. (2011) suggest that government expenditure is positively associated with the deficit, aligning with the findings of (Anwar & Ahmad, 2012).

Figure 3: Deficit versus Debt servicing, Source: Economic Survey of Pakistan various issues, World bank-IDS international debt statistics



Moreover, Batool and Sieg (2009) investigated the political impacts of the budget deficits and modelled elections and quality of democracy to explore the relationship between the political factors and Budeget Deficit.They concluded that the quality of democracy has positive and significant impact on reducing the budget deficit where., the effects of elections in the long run are insignificant. Similar findings of the relationship of budget deficit and the role of corruption and weak institutions were unveiled by the Ullah and Baber (2014). He concluded that the corruption and weak institutions led to inequality, which in turn yields higher budget

deficit. Therefore, keeping in view the varied prospects and conflicting views of the scholars in limited available literature on the relationships of the political, institutional and economic determinants and with varying number of determinants want further investigation into the analysis of the complex interplay that exists between these variables. Studying the budget deficit through the lens of time series analysis in case of pakistan is crucial due to several reasons. First and the utmost important the policy makers are very much concerned about the relationships of these determinants with the budget defict. Therefore, to make policy backed by the intuition of the reduction of budget deficit.

The clear picture and relationships must be known to the policy makers. The available literature on this topic is limited in case of pakistan and, which is available is highly divergent on the policy view of these determinants. Secondly, an empirical inquiry of the budget deficit will also explore the effectiveness of the fiscal policy in the past and pave the way for the improvement in the future. With this exploration we can gain insights into the underlying significant drivers of the budget deficit which ultimately will help the policy makers. Furthermore, doing deep analysis of the drivers of the budget deficit and their impacts on the type of the economic, political and institutional policy of the country will add to the public policy literature in case of pakistan and will clear the picture of the effectiveness of the public policy, which may serve as the basis for other developing countries. Therefore, the present piece of paper intends to find the answers to the following questions in case of pakistan. what is the impact of economic, political and institutional determinants on the budget deficit, and how these relationships evolved over time? And What has determined the budget deficit in pakistan? the general hypothesis to test are, whether there exist significant relationship between the budget deficit and economic, institutional, and political factors. Therefore, the paper has a single objective of exploring the long run relationships between the budget deficits and the economic, institutional, and political factors.The rest of the study consists of 5 sections. The second section consists of detailed literature on the current problem and the third section consists of the data and methodology. Finally, there is section on findings, conclusions and the future thoughts.

2. Literature Review

Kouassy and Bohoun (1993) studied the causes of the budget deficit (BD) of Cote d'Ivoire using the dataset from the period 1970 to 1989. By employing the OLS methodology they uncovered that public investment was positively associated with budget deficit whereas tax sensitivity to public investment was negatively associated with budget deficit. According to the authors' the new policy in Cote d'Ivoire worked in the short run but if the case choice of instruments was narrowed down the policy becomes weak. The authors did not find any signal of assessment of the impact of tax rate strategy on budget deficit. Diokno (2007) in his study examined macroeconomic variables and fiscal rules' effects on budget deficits. He used the two stage least square method on the time series dataset of the Philippines over period 1981 to 2005 and found that capital outlays as a percent of GDP, inflation rate, tax effort, and liquidity were statistically significant in the case when he used national government fiscal balance as the dependent variable. But while using consolidated public sector deficit as a dependent variable of economic growth, intergovernmental fiscal transfers along with inflation rate, liquidity, capital outlays as a percent of GDP, and tax effort were also found statistically significant. The results showed local governments execute good jobs financially during a healthier economy but execute awful when the economy slumps. Whereas fiscal position may be better if economic growth performance is better. The author also recommended a policy that suggests that consolidated public sector deficit should be used in research instead of national government fiscal balance as a dependent variable while the tax management system should be improved strictly.

Batool and Sieg (2009) estimated the behavior of budget deficit with election using the annual dataset from 1973 to 2009. They found election year increases the budget deficit due to net government budgetary borrowings and borrowing from the banking sector. They also found that Pakistan’s society suffers from inexperienced voters and politically driven inefficient economic policies. Tiwari and Tiwari (2011) in his study estimated the role of money supply inflation and government expenditure on budget deficit using a time series dataset on India from a time of 1970 to 2009 and employing deviation from mean regression estimation methodology they found that government expenditure and money supply affect budget deficit

whereas inflation proved to be insignificant. Empirical results showed that money supply and government expenditure were negatively and positively associated with budget deficit respectively. According to the author government expenditure was the major cause of the budget deficit. Anwar and Ahmad (2012) estimated the political factos that determinine the budget deficit in Pakistan by examining the short and long-run relationship between budget deficit and political variables i.e., democracy and size of cabinet. They used the ARDL approach on an annual dataset from 1976 to 2009 and their results showed a long-run equilibrium relationship between budget deficit and Political variables while large government size turned out to be the most significant determinant in affecting budget deficit. On the other hand, democracy showed an insignificant effect on the budget deficit, and the major reasons they pointed out this were poor institutional quality, less democratic government, and lack of availability of transparent data. According to the authors, there are other factors also that would have an impact on the budget deficit.

Kalim and Hassan (2013) in their study estimated the factors causing budget deficit. They applied the ARDL to find the existence of a long-run relationship between budget deficit and independent variables which were debt servicing, money supply, trade, and GDP growth. The study was based on a time series dataset of Pakistan over the time 1976 to 2010. The study found a long-run association between all variables with a budget deficit but failed to find any long-run association between budget deficit and economic-growth measured by the growth in the over level of the GDP. The study also found that all variables caused Granger to budget deficit in the long run. Murwirapachena, Maredza, and Choga (2013) estimated the impact of economic variables on budget deficits in South Africa by applying the Vector Error Correction Model over the time of 1980 to 2010. Their result showed that all the determinants i.e. unemployment rate, government investment, foreign exchange reserves, and economic growth have a positive impact on budget deficit excluding foreign debt. On the other hand, variance decomposition testing shows that foreign reserves explained the major variation in budget deficit afterward foreign debt, unemployment, economic growth, and government investment in sequence. According to the author economic variables alone are important determinants for economists who have no control over political variables. Moreover, there was little literature on developing countries regarding the determinants of budget deficits. Onyango (2013) argues that debt and fiscal deficit are directly correlated the analysis was conducted using the linear multiple regression and a dataset covering Kenya from 2003 to 2012, they discovered that government expenditure, debt service, external revenues from the government, and external revenue are important factors influencing Kenya's budget deficit. They also claimed that the government debt results from the fact that government spending grew faster than receipts.

Furthermore, an inverse relationship exists between government ordinary revenue and the budget deficit**.** Ullah and Baber (2014) in his paper analyzed the fiscal imbalances, poverty, and inequality by applying the ARDL technique to a time series dataset of Pakistan from 1981 to 2010. According to his findings, the deficit increases the poverty level and delivers prejudices about inequality. As deficit is financed through government debt, money supply, and indirect taxes this in turn impends the purchasing power of the poor showing misallocated government spending due to corruption and weak institutions. Jalil, Tariq, and Bibi (2014) studied the impact of price level on a fiscal deficit in Pakistan using the ARDL technique on the dataset from 1972 to 2012. They found that the fiscal deficit was the major determinant of the price level along with other variables like government sector borrowing, interest rates, and private borrowing. They suggested that Pakistan’s economy needs an immediate improvement of fiscal imbalance. Mushtaq, Muzaffar, and Ali (2017) examined the relationship between the Pakistan’s political instability and budgetary imbalances. They used the data sets from the 1980-2014 and utilized the Johnson’s co-integration test to check whether there was any long run relationship between political instability, exchange rate and the budget deficit. They found that the inflation and trade deficit have long run relationships with budget deficits. In a very recent study published by the Ullah and Baber (2014). The findings also elaborate on how higher bureaucracy, democratic accountability, and the rule of law all contribute to lower budget deficits. The detailed and available literature on the subject indicates the clear gap to study, there are several studies which have explored this relationship using the individual factors, the available literature justifies the political factors while ignoring institutional and economic and vice versa, while there some studies while related the economic and institutional factors but with the limited adaptability of the factors of the political and institutional determinants. Therefore, it highlights the need for in depth exploration of the political,

institutional, and economic determinants of the budget defects.Such research could offer valuable insights for policymakers aiming to formulate more effective fiscal policies and address the challenges of budget deficit management in the country.

3. Data, Methodological Description and Derivation

3.1. Data and Sources

Data on modelled variables is collected from the IMF and World Bank Data Bases over the period of 47 years with Annual frequency from the years 1976 to 2023. Depending on the availability of data I have selected the longest possible sample period to evade the small sample biases. Data on the budget deficit and government size are collected from the Economic Survey of Pakistan database while data on Inflation, Debt servicing, and GDP per capita are obtained from the WDI – World Bank. Data on the level of democracy is collected from the University of Gothenburg, Sweden. Data on freedom from corruption is drawn from a database of Heritage Foundation. The Dummy variable for election year is calculated using the election as "1" if there was election in the country and '0' otherwise.

3.2. Econometric Methodology

3.2.1. Unit root test

It is necessary to check the order of the integration of the variables before going towards further test. The Augmented Dickey-Fuller (ADF) unit root test and the Phillips–Perron unit root test (P-P) were used to determine the order of the integration of the variables. The ARDL Bound testing was used to confirm the long run relationship between the modelled variables.The assumption for ARDL bound testing to cointegration approach is that the variables should not be I(2). For this reason, it was necessary to identify the appropriate order of the integration of the vaeraibles and to make sure that there is no variables beyond the order (1). To avoid the potential issues of the serial correlation while checking for the order of integration it was assured that there is no serial correlation, because the critical values by Pesaran, Shin, and Smith (2001) would be invalid in that case. To control serial correlation, we used the ADF testing instead of the Dickey-Fuller (DF) test which fails to control for this time series property. Phillips–Perron test uses the same procedure of Dickey fuller foam with the addition of robustness to control heteroskedasticity and autocorrelation.

3.2.2. The Analytical Model

ARDL cointegration approach developed by Pesaran, Shin, and Smith (2001) with bound testing method has been employed on our models as it enables us to use variables with either all integrated of order I(1) or mix order of integration i.e. I(0) and I(1) and does not necessitate dependent variable to be I(1). According to Pesaran and Shin (1995) this approach gives robust long-run results even with small samples. To attain this benefit we decided to apply the ARDL approach to cointegration with bound testing procedure. Our ARDL models 1, 2, 3, and 4 are given below respectively.

$$\Delta \ln(BD_t) = \theta_{01} + \theta_{11} \ln(BD_{t-1}) + \theta_{21} \ln(INF_{t-1}) + \theta_{31} \ln(DS_{t-1}) + \theta_{41} \ln(GDP_{t-1}) + \theta_{51} \ln(GS_{t-1}) + \sum_{i=1}^{p} \delta 1i \, \Delta \ln(BD_{t-i}) + \sum_{i=0}^{q} \delta 2i \, \Delta \ln(INF_{t-i}) + \sum_{i=0}^{q} \delta 3i \, \Delta \ln(DS_{t-i}) + \sum_{i=0}^{q} \delta 4i \, \Delta \ln(GDP_{t-i}) + \sum_{i=0}^{q} \delta 5i \, \Delta \ln(GS_{t-i}) + \varepsilon_t \quad (1)$$

$$\Delta ln(BD_t) = \theta_{01} + \theta_{11} ln(BD_{t-1}) + \theta_{21} ln(INF_{t-1}) + \theta_{31} ln(DS_{t-1}) + \theta_{41} ln(GDP_{t-1}) + \theta_{51} ln(GS_{t-1}) + \theta_{61} ln(POL_{t-1}) + \sum_{i=1}^{p} \delta 1i \, \Delta ln(BD_{t-i}) + \sum_{i=0}^{q} \delta 2i \, \Delta ln(INF_{t-i} + \sum_{i=0}^{q} \delta 3i \, \Delta ln(DS_{t-i}) + \sum_{i=0}^{q} \delta 4i \, \Delta ln(GDP_{t-i}) + \sum_{i=0}^{q} \delta 5i \, \Delta ln(GS_{t-i}) + \sum_{i=0}^{q} \delta 6i \, \Delta ln(POL_{t-i}) + \varepsilon_t \quad (2)$$

$$\Delta ln(BD_t) = \theta_{01} + \theta_{11} ln(BD_{t-1}) + \theta_{21} ln(INF_{t-1}) + \theta_{31} ln(DS_{t-1}) + \theta_{41} ln(GDP_{t-1}) + \theta_{51} ln(GS_{t-1}) + \theta_{61} (ELEC_t) + \theta_{71} (ELEC_{t-1}) + \theta_{81} (ELEC_{t+1}) + \sum_{i=1}^{p} \delta 1i \, \Delta ln(BD_{t-i})$$

$$+\sum_{i=0}^{q}\delta 2i\ \Delta ln(INF_{t-i})+\sum_{i=0}^{q}\delta 3i\ \Delta ln(DS_{t-i})\ +\ \sum_{i=0}^{q}\delta 4i\,\Delta ln(GDP_{t-i})\ +\ \sum_{i=0}^{q}\delta 5i\ \Delta ln(GS_{t-i})$$
$$+\ \delta 6i\,\Delta(ELEC_t)\ +\ \delta 7i\,\Delta(ELEC_{t-1})$$
$$+\ \delta 8i\,\Delta(ELEC_{t+1})\ +\ \varepsilon_t \qquad \textbf{(3)}$$

$$\Delta\, ln(BD_t)\ =\ \theta_{01}\ +\ \theta_{11} ln(BD_{t-1})\ +\ \theta_{21}\, ln(INF_{t-1})\ +\ \theta_{31}\, ln(DS_{t-1})\ +\ \theta_{41}\, ln(GDP_{t-1})\ +\ \theta_{51}\, ln(GS_{t-1})$$
$$+\ \theta_{61}\, ln(FC_{t-1})$$
$$+\ \textstyle\sum_{i=1}^{p}\delta 1i\ \Delta ln(BD_{t-i})\ +\ \sum_{i=0}^{q}\delta 2i\ \Delta ln(INF_{t-i})+\sum_{i=0}^{q}\delta 3i\ \Delta ln(DS_{t-i})+\sum_{i=0}^{q}\delta 4i\ \Delta ln(GDP_{t-i})+$$
$$\textstyle\sum_{i=0}^{q}\delta 5i\ \Delta ln(GS_{t-i})+\sum_{i=0}^{q}\delta 6i\ \Delta ln(FC_{t-i})+\varepsilon_t \qquad (\mathbf{4})$$

Where θ_{11}, θ_{21}, θ_{31}, θ_{41}, θ_{51}, θ_{61}, θ_{71} and θ_{81} are long run elasticities while δ_{1i}, δ_{2i}, δ_{3i} and δ_{4i} are short run dynamics and Δ is first difference operator. p and q are showing optimal lag length. To solve our model equation, we first applied a bound test to check the existence of long-run association between variables. This test provides upper and lower bond values our calculated F-statistics should be greater than the upper bound value for the existence of long-run association if it lies between the two bounds test becomes inconclusive and if it is below the lower bound then no association exists between variables. Our H_0 Null hypothesis is that no long-run association exists while the alternative H_1 hypothesis is long-run association exists. In the case of H_1, we can move to cointegrating foam. ECM of models 1,2,3 and 4 are written as

$$\Delta\, ln(BD_t)\ =\ \sum_{i=1}^{p}\delta 1i\ \Delta\, ln(BD_{t-i})\ +\ \sum_{i=0}^{q}\delta 2i\ \Delta\, ln(INF_{t-i})\ +\ \sum_{i=0}^{q}\delta 3i\ \Delta\, ln(DS_{t-i})$$
$$+\sum_{i=0}^{q}\delta 4i\ \Delta\, ln(GDP_{t-i})\ +\ \sum_{i=0}^{q}\delta 5i\ \Delta\, ln(GS_{t-i})\ +\ \lambda\, EC_{t-1}\ +\varepsilon_t \ldots\ldots\ldots (\mathbf{5})$$

$$\Delta\, ln(BD_t)\ =\ \sum_{i=1}^{p}\delta 1i\ \Delta ln(BD_{t-i})\ +\ \sum_{i=0}^{q}\delta 2i\ \Delta ln(INF_{t-i})+\sum_{i=0}^{q}\delta 3i\ \Delta ln(DS_{t-1})$$
$$+\sum_{i=0}^{q}\delta 4i\,\Delta ln(GDP_{t-i})+\ \sum_{i=0}^{q}\delta 5i\ \Delta ln(GS_{t-i})+\ \sum_{i=0}^{q}\delta 6i\ \Delta ln(POL_{t-i})+\ \lambda\, EC_{t-1}$$
$$+\varepsilon_t \qquad \ldots\ldots\ldots (6)$$

$$\Delta\, ln(BD_t)\ =\ \sum_{i=1}^{p}\delta 1i\ \Delta ln(BD_{t-i})\ +\ \sum_{i=0}^{q}\delta 2i\ \Delta ln(INF_{t-i})\ +\ \sum_{i=0}^{q}\delta 3i\ \Delta ln(DS_{t-i})$$
$$+\ \textstyle\sum_{i=0}^{q}\delta 4i\,\Delta ln(GDP_{t-i})\ +\ \sum_{i=0}^{q}\delta 5i\ \Delta ln(GS_{t-i})\ +\ \delta 6i\,\Delta(ELEC_t)\ +\ \delta 7i\,\Delta(ELEC_{t-1})+\ \delta 8i\,\Delta(ELEC_{t+1})\ +$$
$$\lambda\, EC_{t-1}+\ \varepsilon_t \qquad \ldots\ldots\ldots\mathbf{(7)}$$

$$\Delta\, ln(BD_t)=\sum_{i=1}^{p}\delta 1i\ \Delta ln(BD_{t-i})\ +\ \sum_{i=0}^{q}\delta 2i\ \Delta ln(INF_{t-i})\ +\ \sum_{i=0}^{q}\delta 3i\ \Delta ln(DS_{t-i})$$
$$+\sum_{i=0}^{q}\delta 4i\,\Delta ln(GDP_{t-i})+\ \sum_{i=0}^{q}\delta 5i\ \Delta ln(GS_{t-i})+\sum_{i=0}^{q}\delta 6i\ \Delta ln(FC_{t-i})+\ \lambda\, EC_{t-1}$$
$$+\ \varepsilon_t \qquad \ldots\ldots\ldots (\mathbf{8})$$

Where parameter λ is the speed of adjustment and EC is the error correction term.

4. Empirical Results and Discussion

Table 1: Summary of the variables

Variables	BD	INF	DS	GDP	GS	POL	ELEC	FC
Mean	6.53	44.42	3.60	31402.55	16.52	4.49	0.20	22.80
Median	6.45	31.91	3.69	15219.62	16.15	5.04	0.00	23.00
Maximum	10.20	145.30	6.62	135470.6	20.50	7.83	1.00	30.00
Minimum	2.30	6.43	1.31	1918.83	12.30	1.58	0.00	10.00
Std. Dev	1.92	40.36	1.35	37270.13	2.31	2.22	0.41	4.82
Observations	47	47	47	47	47	47	47	47

4.1. Unit Root Test

Before applying ARDL we have applied the unit root testing so that it can be confirmed that no variable is an integrated of the order I(2).

Table 2: ADF) and PP) tests of unit root on level and natural logs of variable

Variables	ADF			PP			
	SIC lag	t-Stat	Critical value at 5%	Bandwidth	t-Stat	Critical value at 5%	Decision
Ln(BD)	0	-2.62_a*	-2.93	1	-2.57_a	-2.93	(NS)
Ln(INF)	5	-4.49_b***	-3.54	4	0.15_a	-2.93	(S)[e]
Ln(DS)	0	-2.23_b	- 3.52	0	-2.23_b	-3.52	(NS)
Ln(GDP)	0	-2.21_b	-3.52	2	-2.22_b	-3.52	(NS)
Ln(GS)	0	-2.08_a	-2.93	1	-2.07_a	-2.93	(NS)
Ln(POL)	0	-1.88_a	-2.93	4	-2.26_a	-2.93	(NS)
Ln(FC)	1	-6.34_b***	- 3.67	6	-7.47_a***	-3.02	(S)

NS = Non-Stationary, S= Stationary

Table 3: Augmented Dickey Fuller Test (ADF) and Philis and Perron)PP) tests of unit root a level on natural logs of variables

	SIC lag	t-Stat	Critical value at 5%	Band-width	t-Stat	Critical value at 5%	Decision
ΔLn(BD)	0	-7.40_c***	-1.94	2	-7.41_c***	-1.94	Stationary
ΔLn(INF)	0	-4.70_a***	-2.94	3	-3.94_a***	-2.94	---
ΔLn(DS)	0	-5.88_c***	-1.94	4	-7.51_c***	-1.94	Stationary
ΔLn(GDP)	0	-6.41_a***	-2.94	0	-6.41_a***	-2.94	Stationary
ΔLn(GS)	0	-5.37_c***	-1.94	5	-6.90_c***	-1.94	Stationary
ΔLn(POL)	0	-4.78_c***	-1.94	3	-6.74_c***	-1.94	Stationary
ΔLn(FC)	1	-6.75_c***	-1.96	12	-18.14_c***	-1.96	---

Tables 2 and 3 didn't show the I(2) order of integration. It is also clear from the tables above that the variables have shown the mixed order of integration. The tables have brief descriptions on the statistrics in the tables, like Model with intercept is presented by the (a), and the Model with intercept and trend is presented by the (b) and the Model without intercept and trend is represented by the (c). The testing procedure was carried out using the significance of trend and intercept the estimation where trend and intercept are significant were included similarly where intercept is significant it was included while both were excluded in case of insignificant. Based on Automatic lag length SIC. (e) Due to tie we used KPSS that also showed CPI to be of order I(0) integrated. LM Stat 0.07_b critical value at 5% sig. level (0.14). KPSS Null hypothesis is opposite to ADF and PP. ***,**, *denotes significance level at 1%, 5%, and 10% respectively.

4.2. Model Estimation and Results

Table 4: Results from the Bound test, Model 1

ARDL	F-statistics	Decision
BD = f (INF, DS, GDP, GS)	6.22****	Cointegration
Bound Critical values	Lower	Upper
Significant at 1%	3.74	5.06
Significant at 2.5%	3.25	4.49
Significant at 5%	2.86	4.01
Significant at 10%	2.45	3.52

****, ***, **, * denotes significance at 1%, 2.5%, 5% and 10% level

Table 4 depicts that the value of F-statistics is greater than the upper bound value, so we reject our null hypothesis of no cointegration and accept the alternative hypothesis that cointegration among variables exists.

The ARDL (p1, q1, q2, q3, q4) model 1 is estimated and results are placed in in table 5 using specification (1, 0, 2, 0, 2) based on the AIC criterion. Table 5 demonstrates a significant and positive correlation between inflation (INF) and budget deficit. The coefficient value for INF is 1.11, indicating that a 1% rise in INF is attributed to 1.11% increase in the budget deficit. The positive sign aligns with our assumptions and hypothesis, and it is consistent with the findings of (Jalil et al., 2014). The most important determinant debt servicing (DS) has negative and significant correlation with the budget deficit. The estimates coefficient shows the -1.03% decrease in the budget deficit with 1% increase in the debt servicing. As it depends on

previous year so lag may be included for clear view. While the budget deficit has negative and significant relationship with the economic growth.

Table 5: Estimated Long-Run Coefficients of ARDL Model 1 (1,0,2,0,2) based on AIC (Dependent Variable Ln(BD)

Regressors	Coefficients	Standard Errors
Constant	2.37	(2.89)
Ln(INF)	1.11*	(0.66)
Ln(DS)	-1.03***	(0.17)
Ln(GDP)	-1.06**	(0.47)
Ln(GS)	2.58***	(0.43)
R-square	0.62	---
Adj R-Square	0.50	---
F-staistic	5.12***	---
D-W STAT	2.15	---
Table 5b: Short -Run Coefficients		
Δ Ln(INF)	0.95*	(0.60)
Δ Ln(DS)	-0.22*	(0.12)
Δ Ln(DS(-1))	0.34***	(0.12)
Δ Ln(GDP)	-0.91***	(0.44)
Δ Ln(GS)	1.56***	(0.32)
Δ Ln(GS(-1))	-1.00***	(0.37)
ECM(-1)	-0.85***	(0.14)

***, **, * showing a significance at 1%, 5%, and 10% respectively

The estimated elasticity of the coefficient indicates that 1% growth the GDP leads to decrease in the budget deficit with 1.03%. this finding on the relationship of the GDP growth and budget deficit is aligned with earlier findings of the Anwar and Ahmad (2012). The short-run results are also presented in the table 5 which show another significant relationship between the inflation (INF) and the budget deficit. The coefficient value of 0.95 suggest that with 1% rise in the inflation level causes the 0.95% rise in the budget deficit. The variable government spending (GS) which is the proxy variable for the size of the government has a strong and negative correlation with the budget deficit, as indicated by a coefficient value of -0.22. This means that for every 1% increase in DS, the budget deficit decreases by 0.22%. The ECM value of -0.85 is significant at a 1% significance level. The negative sign indicates that the speed of adjustment from the previous year's disequilibrium to the current year's equilibrium is 85%, which represents a substantial shock adjustment.

Table 6: Post estimation Analysis of Model 1

Diagnostic Tests	F-statistics	Probability
B-Godfrey Serial Correlation Test	0.20	0.81
ARCH-LM Heteroskedasticity Test	0.06	0.80
Jarque-Bera Test	1.18	0.55
Ramsey RESET Test	0.33	0.56

Table 6 depicts that Model 1 has passed all the tests, the Serial Correlation test (Durbin Watson and Breusch-Godfrey LM), ARCH Heteroskedasticity test, Jarque-Bera test of normality of errors, and Ramsey RESET test which suggests that the model is well specified. Table 7 depicts that the value of F-statistics is greater than the upper bound value, so we reject our null hypothesis of no cointegration and accept the alternative hypothesis that cointegration among variables exists.

Table 7: Results from Bound test Model 2

ARDL	F-statistics	Decision
BD = f (INF, DS, GDP, GS, POL)	3.58*	Cointegration
Bound Critical values	**Lower**	**Upper**
Significant at 1%	3.41	4.68
Significant at 2.5%	2.96	4.18
Significant at 5%	2.62	3.79
Significant at 10%	2.26	3.35

****, ***, **, * denotes significance at 1%, 2.5%, 5% and 10% level

Table 8: Long-Run Coefficients of ARDL Model 2 (1,0,1,0,0,1) based on AIC. Dependent Variable Ln(BD)

Regressors	Coefficients	Standard Errors
Constant	11.15***	(3.71)
Ln(INF)	2.67***	(0.93)
Ln(DS)	-0.80***	(0.19)
Ln(GDP)	-2.16***	(0.67)
Ln(GS)	1.21*	(0.60)
Ln(POL)	0.16	(0.13)
R-squared	0.51	---
Adj R-Squared	0.38	---
F-statistic	4.01***	---
D-W statistic	2.15	---
Short -Run Coefficients		
Δ Ln(INF)	1.80***	(0.65)
Δ Ln(DS)	-0.24*	(0.12)
Δ Ln(GDP)	-1.46***	(0.47)
Δ Ln(GS)	0.82**	(0.38)
Δ Ln(POL)	0.32***	(0.10)
ECM(-1)	-0.67***	(0.13)

Shows ***, **, * significance at 1%, 5%, and 10% level.

In table 8 the orders of the ARDL is estimated using specification (1,0,1,0,0,1) based on AIC. Table 8 reveals the same results as Table 5 except that INF magnitude has increased to 2.67, DS magnitude has decreased to -0.80 economic growth coefficient magnitude has increased to -2.16 whereas GS magnitude has decreased to 1.21 and is positively affecting, the incorporation of the new variable Polity reveals insignificant relation with deficit which is in line with Anwar and Ahmad (2012). The short-run dynamics results of Table 8 show that factors of budget deficit are affecting in the same direction but with small changes in magnitude as compared to the long run. Whereas in the short run polity is significantly and positively affecting budget deficit. The positive sign could be because of the amalgam of dictatorship and democracy or lack of democracy in Pakistan's history together with the involvement of a corrupt government. The ECM value is -0.67 which is highly significant at a 1% significance level with the negative sign which implies that the speed of adjustment from the previous year's disequilibrium to the current year's equilibrium is 67% which is a high shock adjustment.

Table 9: Post Estimation Analysis of the Model 2

Diagnostic Tests	F-statistics	Probability
Serial correlation Test B-Godfrey	1.82	0.18
Heteroskedasticity Test (ARCH-LM)	0.09	0.76
Normality test (Jarque-Bera Test)	1.46	0.48
Fucntional form (Ramsey RESET Test)	0.09	0.75

Table 9 depicts that Model 2 has passed all the tests as the statistics values of the Breusch-Godfrey Serial Correlation, ARCH Heteroskedasticity Test, Jarque-Bera Test and, the Ramsey RESET Test shows that the model is stable and free from any model error.

Table 10: Results from the Bound test Model 2.1

ARDL	F-statistics	Decision
BD = f (INF, DS, GDP, GS, POL)	4.72****	Cointegration
Bound Critical values @	Lower	Upper
1%	3.41	4.68
2.5%	2.96	4.18
5%	2.62	3.79
10%	2.26	3.35

****, ***, **, * denotes significance at 1%, 2.5%, 5% and 10% level

Table 10 depicts that the value of F-statistics is greater than the upper bound value, so we reject our null hypothesis of no cointegration and accept the alternative hypothesis that cointegration among variables exists.

Table 11: Estimated Long-Run Coefficients of ARDL Model 2.1 (1,0,2,0,2,1) using AIC. Dependent Variable Ln(BD)

Regressors	Coefficients	Standard Errors
Constant	5.99*	(3.31)
Ln(INF)	2.14***	(0.78)
Ln(DS)	-1.09***	(0.20)
Ln(GDP)	-1.80***	(0.56)
Ln(GS)	2.66***	(0.76)
Ln(POL)	-0.03	(0.13)
Short run coefficients		
Δ Ln(INF)	1.73***	(0.63)
Δ Ln(DS)	-0.27**	(0.12)
Δ Ln(DS(-1))	0.21*	(0.13)
Δ Ln(GDP)	-1.46***	(0.46)
Δ Ln(GS)	1.23***	(0.40)
Δ Ln(GS(-1))	-0.89**	(0.35)
Δ Ln(POL)	0.27**	(0.11)
ECM(-1)	-0.80***	(0.14)

Denotes ***, **, * significance at 1%, 5%, and 10% level

In Table 11 the orders of the ARDL (p_1, q_1, q_2, q_3, q_4) model 2.1 is estimated using specification (1,0,2,0,2,1) based on AIC. Table 11 reveals the same results as Table 8 while the significance of the variable has improved with small differences in their magnitudes whereas Polity remained insignificant in the long run. The short-run dynamics results show that variables are affecting budget deficit in the same direction but with small changes in magnitude as compared long run. The coefficient of polity is significantly and positively affecting the budget deficit. Here the ECM value is -0.80 which is highly significant at a 1% significance level with a negative sign which implies that the speed of adjustment from the previous year's disequilibrium to the current year's equilibrium is 80% which is a high shock adjustment.

Table 12: Post Estimation Analysis of the Model 2.1

Diagnostic Tests	F-statistics	Probability
Serial Correlation Test (Breusch-Godfrey)	1.37	0.27
Heteroskedasticity Test (ARCH-LM)	1.93	0.17
Normailty Test (Jarque-Bera Test)	0.75	0.68
Ramsey RESET Test	0.77	0.38

Table 12 depicts that Model 2.1 has passed all the tests and free from any modelling and econometric errors.

Table 13: Results from Bound test Model 3

ARDL	F-statistics	Decision
BD = f (INF, DS, GDP, GS, ELEC)	5.35****	Cointegration
Bound Critical values @	Lower	Upper
1%	3.74	5.06
2.5%	3.25	4.49
5%	2.86	4.01
10%	2.45	3.52

****, ***, **, * denotes significance at 1%, 2.5%, 5% and 10% level

Table 13 depicts that the value of F-statistics is greater than the upper bound value, so we reject our null hypothesis of no cointegration and accept the alternative hypothesis that cointegration among variables exists. Table 13 shows the functional relationships between inflation, debt servicing, gross domestic product, government spending, and dummy variable election and their effect on the budget deficit. The bound test therefore suggests that there exists a long-run cointegrating vector between this relationship and budget deficit is determined by at least one long-run relationship between the variables in the functional form. This relationship has been estimated by the auto-regressive distributed lag model approach, given the dynamic nature and order of the integration of the variables. This model best suits the nature of the data.

Table 14: Estimated Long-Run Coefficients of ARDL Model 3 (1, 0, 2, 0, 2) based on AIC Dependent Variable Ln(BD)

Regressors	Coefficients	Standard Errors
Constant	3.51	(3.46)
Ln(INF)	1.31*	(0.74)
Ln(DS)	-1.04***	(0.18)
Ln(GDP)	-1.21**	(0.53)
Ln(GS)	2.46***	(0.54)
ELEC	0.10	(0.11)
$ELEC_{t-1}$	0.06	(0.10)
$ELEC_{t+1}$	-0.03	(0.09)
R-squared	0.65	---
Adj R-squared	0.48	---
F-statistic	3.87***	---
DW-statistic	2.22	---
Short -Run Coefficients		
ΔLn(INF)	1.10	(0.67)
ΔLn(DS)	-0.28*	(0.13)
ΔLn(DS(-1))	0.33**	(0.14)
ΔLn(GDP)	-1.01*	(0.50)
ΔLn(GS)	1.42***	(0.35)
ΔLn(GS(-1))	-0.94**	(0.38)
$\Delta ELEC_t$	0.09	(0.09)
$\Delta ELEC_{t-1}$	0.05	(0.09)
$\Delta ELEC_{t+1}$	-0.03	(0.08)
ECM(-1)	-0.83***	(0.16)

Denotes ***, **, * significance levels at 1%, 5%, and 10% level

Table 14 shows the orders of the ARDL (p_1, q_1, q_2, q_3, q_4) model 3 is estimated using specification (1, 0, 2, 0, 2) with AIC. Table 14 reveals the same results of the basic model except for small changes in coefficient magnitudes, the incorporation of dummy ELEC shows insignificance with deficit in the long run. The short-run dynamics results reveal that the variables are affecting the budget deficit in the same direction but with small changes in magnitude as compared to the long run. In the short run, the dummy ELEC also shows insignificance with a budget deficit.

Table 15: Post Estimation Analysis of the Model 3

Diagnostic Tests	F-statistics	Probability
Serial Correlation Test (Breusch-Godfrey)	0.14	0.86
Heteroskedasticity Test (ARCH-LM)	0.45	0.56
Normality (Jarque-Bera Test)	0.93	0.62
Ramsey RESET Test	0.34	0.56

Table 15 depicts that Model 3 show that the estimated model has significant impact on the modelled relationships as the values of the post estimation test are significant and showing that there is no error in the model.

Table 16 depicts the value of F-statistics is greater than the upper bound value, so we reject our null hypothesis of no cointegration and accept the alternative hypothesis that cointegration among variables exists.

Table 16: Results from Bound of Model 4

ARDL Model 4	F-statistics	Decision
BD = f (INF, DS, GDP, GS, FC)	6.69***	Cointegration
Bound Critical values @	Lower	Upper
1%	3.41	4.68
2.5%	2.96	4.18
5%	2.62	3.79
10%	2.26	3.35

****, ***, **, * level pof significance at 1%, 2.5%, 5% and 10% level

Table 17: Estimated Long-Run Coefficients of ARDL Model 4 (1,1,2,1,1,2) based on AIC, Dependent Variable Ln(BD)

Regressors	Coefficients	Standard Errors
Constant	25.57	(14.88)
Ln(INF)	6.23**	(2.38)
Ln(DS)	-1.25*	(0.54)
Ln(GDP)	-5.01*	(1.98)
Ln(GS)	0.16	(1.37)
Ln(FC)	1.62	(0.88)
R-square	0.96	---
Adj R-square	0.88	---
F-statistic	12.10***	---
DW-Stat	1.57	---
Short -Run Coefficients		
Δ Ln(INF)	1.99	(1.18)
Δ Ln(DS)	-0.09	(0.18)
Δ Ln(DS(-1)	0.51**	(0.16)
Δ Ln(GDP)	-0.89	(1.34)
Δ Ln(GS)	2.51**	(0.87)
Δ LN(FC)	0.42	(0.30)
Δ LN(FC(-1))	-0.38	(0.26)
ECM(-1)	-0.88**	(0.23)

In table 17 the order of the ARDL (p_1, q_1, q_2, q_3, q_4) model 4 is estimated using specification (1, 1, 2, 1, 1, 2) based on AIC. Table 17 reveals that INF magnitude has increased to 6.23, DS now has a magnitude of -1.25 economic growth coefficient magnitude has increased to -5.01 whereas GS coefficient is now insignificant. The incorporation of the new variable FC reveals insignificance with the deficit in the long run. The short-run dynamics results that only GS and the lag of DS are significant whereas others including FC are insignificant.

Table 18: Post-Estimation of the Model 4

Diagnostic Tests	F-statistics	Probability
Serial Correlation Test (Breusch-Godfrey)	2.10	0.26
Heteroskedasticity Test (ARCH-LM)	0.03	0.84
Normality (Jarque-Bera Test)	0.93	0.62
Ramsey RESET Test	1.53	0.28

Table 18 depicts that Model 4 has passed all the tests, the Serial Correlation test (Durbin Watson and Breusch-Godfrey LM), ARCH Heteroskedasticity test, Jarque-Bera test of normality of errors, and Ramsey RESET test which suggests that the model is well specified

5. Conclusion

The study's findings hold significant implications for policymakers in Pakistan. By identifying the key determinants of budget deficits, policymakers can formulate more effective fiscal policies to manage and reduce deficits. For instance, the study's emphasis on the detrimental effects of inflation and debt servicing on fiscal balance underscores the importance of implementing measures to control inflation and manage debt levels effectively. Similarly, the findings regarding the impact of slow economic growth highlight the need for policies aimed at stimulating economic activity and fostering growth.

Additionally, the important finding of the study on the size of the government as detrimental to the budget deficit has important implications for the policy makers. It underscores the need for the efficient public expenditures management and the fiscal consolidation. Furthermore, the study has implications for the future research on the relationships of the political determinants of the budget deficits. The important hypothesis on the relationship between the political factors and the budget deficit was insignificant else government size which is signifantly and positively linked showing that is need for the efficient administration of public funds. The relationship between corruption and deficit is not confirmed in case of Pakistan which suggests the need for further research to understand the complexities of institutional influences on fiscal policy. Future studies could explore additional political

factors that may impact budget deficits, as well as investigate the role of other economic and institutional variables. Major conclusions from empirical examination of economic, political, and institutional influences on Pakistani budget deficits. First, inflation (INF) strongly correlates with budget deficits (coefficient = 1.11). This shows that 1% inflation increases the budget deficit by 1.11%. This matches Jalil et al. (2014). Second, debt servicing (DS) is strongly and adversely connected to budget deficits (-1.03 coefficient). A 1% increase in debt payments reduces the budget deficit by 1.03%. The study suggests adding a loan servicing lag to better assess its effects. Thirdly, budgetary deficits negatively affect economic growth by -1.06. A 1% rise in economic growth reduces the budget deficit by 1.03%. The negative result matches Anwar and Ahmad (2012) 's results.

Finally, government size (GS) is positively and strongly associated to budget deficits, with a coefficient value of 2.58% for a 1% rise in government size. This finding also confirms the relationship established by the Anwar and Ahmad (2012). This empirical analysis also revealed the comparable relationship between the factors affecting budget deficit in the short run with varying magnitudes. The correlations of the inflation was positive and significant with the coefficient of 0.95 with the budget deficit. The debt servicing was also significant and negative with the coefficient value of -0.22. the budget deficit was negatively and significantly connected with the GDP growth in the short run while the size of Government (GS) was positive and significantly related to the budget deficit. The error correction term (ECM) is -0.85 and significant indicating that the model will converge to the long run relationship again as a result of the short run fluctuations and the proportion of the converged in the one year would be 0.85%. This research provides useful insights into the complex nature of the budget deficit in Pakistan, including its long-term and short-term dynamics. It experimentally establishes the relationship between multiple causes of the budget deficit. The findings indicated that inflation, debt servicing, economic growth, and the size of government had a substantial and pivotal impact on determining the budget deficit. The study also found an inconsequential correlation between the budget deficit and several political factors.

5.1. Recommendations

The study has broader implications for the budget deficit in Pakistan and the measures to control for it. Several recommendations can be proposed to enhance the fiscal management in pakistan. To begin with there is a need for strict measures to control for the inflation, this is a key driver of the inflation as identified by the empirical investigation. This may involve implementing the monetary policies aimed at stabilizing the prices and curbing the inflationary pressures. Additionally, the government should reduce its debt burden to reduce the debt serving, this may include the renegotiating terms of the existing debts and debt servicing charges. Furthermore, the policies stimulating the economic growth should be prioritized. This relationship is crucial for the economic growth and reducing budget deficit. Finally, the size of government should be rational and improving the public sector service delivery can help in the growth and therefore, ultimately reducing the budget deficit. This may assume spending by the government sectors which have high growth potential such as the education, health, information technology. By doing so, in the light of current empirical investigation, Pakistan can move towards the fiscal sustainability and can ensure a stable and resilient economy.

5.2. Future Thoughts

Keeping in view the detailed empirical findings and recommendations, the future research should delve deeper to uncover the implicit nature of the political dynamics and fiscal policy in pakistan to uncover any latent influences that may have not been evident in this study. Additionally, to expand the scope of this study, this may include the more determinants of the budget deficit and their feedback effects into the model, this may further extend using the more advanced econometric techniques using the Vector Auto Regression methodology to study the possibility of various feedbacks because of shocks in any other determinants of the modelled variables. Furthermore, the study may include the role of the ethnological advancements and digital governance in improving the fiscal consolidation, it may also offer the understanding of the budget deficit.

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Appendix

Name of Variables	Detailed Description	Unit of measurement	Acronym/ Code	Sources of Variables
Budget Deficit (BD)	Total revenues minus the total expenditures. Also known as the net lending	Percent of GDP	BD	Economic survey of Pakistan various issues.
Inflation, average consumer prices	CPI based inl=flation rate	Index	CPI	IMF, IFS[a]
Debt Servicing	Total debt service is the sum of principal repayments and interest actually paid in currency, goods, or services on long-term debt, interest paid on short-term debt and repayments to the IMF.	Percent of GNI	DS	World Bank-IDS[b].
GDP per capita	GDP per capita is the GDP/ Population in the Constant US$	Local Currency Unit	GDP	World Bank-NAD and OECD NAD files[c].
Government Size	Current expenditures of the government as proxy.	Percent of GDP	GS	Economic survey of Pakistan various issues.
Polity 2	Polity index is used to measure level of Democracy. It scales from 0-10. Where 0 is indicates least democracy and 10 most democratic.	Index	POL	University of Gothenburg
Election Year	Coded as the when no parlimenrary election "0" otherwise "1".	N/A	ELEC	Author's Own Calculation
Freedom from Corruption	Level of corruption in the economu measure by the FFCI ranges from 0-100	Index_FFCI	FC	Heritage Foundation

a) International Monetary Fund, International Financial Statistics and data files.
b) World bank-IDS international debt statistics
c) World Bank-National accounts data and OECD National Accounts data files.
d) University of Gothenburg, The Quality of Government Dataset Codebook.