Fiscal Sustainability and Pension Liabilities of Pakistan

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ABSTRACT

The study evaluates fiscal sustainability in Pakistan by examining pension expenditures and their implications. Using data from 2000–2020, the Auto-Regressive Distributed Lag (ARDL) model is applied to explore how pension expenditures affect fiscal sustainability in Pakistan. The results highlight a positive impact of pension expenditures on the primary deficit, suggesting that fiscal imbalances increase with a rise in pension costs. The negative relationship between the primary deficit and the debt-to-GDP ratio indicates the presence of fiscal sustainability, although the impact is moderate. Based on key observations, it is recommended that Pakistan implement pension reforms to overcome fiscal challenges and improve financial sustainability.

Keywords: Pension, pension reform, fiscal sustainability, public debt

JEL classification codes: H75, H55, E62, H63

1. INTRODUCTION

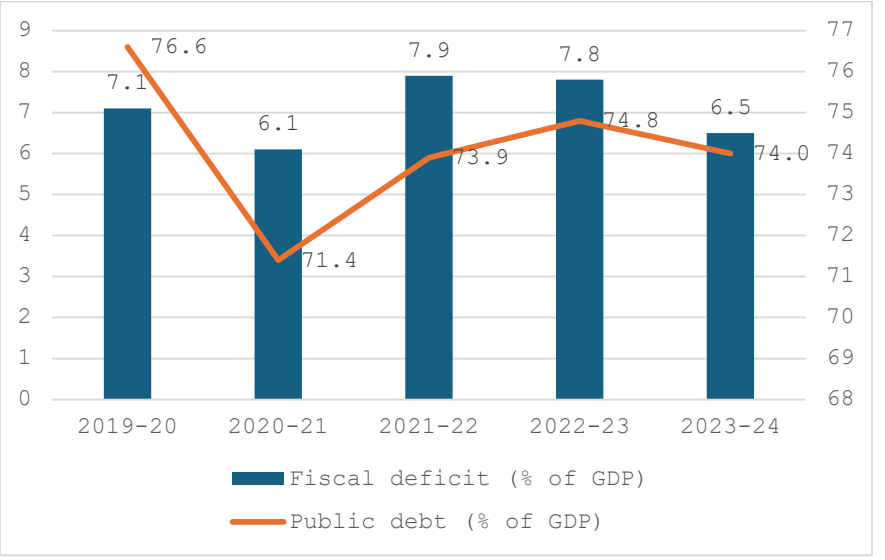
Fiscal sustainability defines the capacity of governments to implement their fiscal policies over the long term (Zahariev *et al.*, 2021). Public debts help overcome the gap between revenue and expenditures (Joy and Panada, 2020). However, the drawback of excessive debt accumulation can pose significant fiscal risks for both current and future generations (Argentiero & Cerqueti, 2019). Greece is a major example in this regard, where external support was used to avoid debt defaults, while Portugal and Spain also relied on public debts to combat fiscal challenges.

Developing countries face significant challenges in the form of rising pension expenditures, which shrink fiscal space. Fiscal sustainability is affected by population aging, posing risks to existing pension system frameworks. The IMF (2021) stated that as populations age, the proportion of retirees increases relative to the working-age population, and this demographic shift creates fiscal pressure

on pension systems. Developing countries can adopt measures similar to those of the European Union (EU), which scaled down public pension benefits and their growth to control pension expenditures. This measure helped the EU achieve a stable and sustainable path for public finances.

Lower levels of revenue collection and rising government expenditures are major factors contributing to the budget deficit in Pakistan (Hussain & Idrees, 2015). The budget deficit is financed by excessive private and public borrowing, resulting in an accumulated debt burden that threatens fiscal sustainability (Khan, 2016). Additionally, a large portion of fiscal resources is allocated to the interest cost of public debt. Chohan (2019) pointed out that debt levels are likely to increase further in the future, leading to severe fiscal implications.

Figure 1: Total Debt and Budget Deficit as a Percentage of GDP



Source: Economic Survey of Pakistan

Figure 1 explains that Pakistan is facing the issue of a budget deficit, as revenue collections are lower compared to rising expenditures. Due to this, public sector expenditure patterns in Pakistan exhibit uncertain behavior (Ahmed & Javed, 2017). Besides, total debt as a percentage of GDP is also quite high. Fiscal sustainability in Pakistan is further affected by growing pension liabilities, which are increasing with time. Excluding provincial governments, the federal government's pension-related expenditures during FY 2023-24 amounted to Rs.

801 billion, marking a significant increase from Rs. 463 billion in FY 2019-20. The latest budget estimates (2024-25) project pension expenditures to be Rs. 1,014 billion. This means there will be a growth of 119% in pension expenditures from 2019-20. This indicates that the pension burden is rising in both nominal and real terms, with federal pension expenditures experiencing an approximately 18% increase in real terms.

Table 1: Federal Pension Expenditure

Year	Pension expenditures (Rs. in Billion)
2019-20	463
2020-21	470
2021-22	540
2022-23	609
2023-24	801
2024-25 (B.E)	1,014

Source: Annual Budget Statements

Table 1 shows that the federal government's pension expenditures are growing considerably over time. Pension expenditures are expected to rise further in the future. SBP (2020) reported that the old-age dependency ratio is 8.5%, which is expected to rise to 11.2% by 2040. With the growing proportion of the dependent population, pension expenditures in Pakistan are projected to increase from 1.2% of GDP in 2015 to 3.5% of GDP by the end of the century (Raza *et al.*, 2021). Both the World Bank and the International Monetary Fund (IMF) have identified rising pension costs as a critical challenge to Pakistan's debt sustainability. The IMF projected that the Net Present Value (NPV) of Pakistan's pension spending will reach approximately 10.9% of GDP within the next 30 years.

The State Bank of Pakistan (SBP, 2020) reported that overall pension spending as a share of tax revenue for FY 2020 was 18.7%. This indicates that spending has doubled over the last ten years. The Government of Pakistan is gradually implementing pension reforms by following the footsteps of global best practices to ensure fiscal sustainability and tackle rising pension expenditures.

This study explores the impact of rising federal pension expenditures on fiscal balance while accounting for key macroeconomic variables. The study used the Auto-Regressive Distributed Lag (ARDL) model for data ranging from 2000-2020. The study contributes to stressing that immediate pension reforms are required to attain fiscal sustainability in Pakistan.

Section 1 of the study provides a brief introduction to rising pension expenditures. Section 2 reviews the relevant studies from literature, followed by Section 3, which sheds light on the theoretical background. Section 4 explains the data and methodology, Section 5 presents the results, and the final section offers the conclusion.

2. LITERATURE REVIEW

Bohn (1998) derives a policy rule consistent with rational behavior to determine debt stability in a country by satisfying the intertemporal budget constraint. Studies such as Vasconcelos (2021) and Pradanov and Naydenov (2020) have stated that fiscal sustainability largely depends on the debt level. The positive impact of the debt-to-GDP ratio on the primary balance-to-GDP ratio indicates that public debt policy is stable. Furthermore, the debt-to-GDP ratio should exhibit mean-reverting behavior for fiscal sustainability. Various studies, including Reinhart *et al.* (2003), Arghyrou and Luintel (2007), Byrne *et al.* (2011), and Armstrong and Okimoto (2016), have explored fiscal sustainability and its relationship with public debt.

Decoster *et al.* (2014) used data on Belgium's public finances and found that rising age-related expenditures are impacting fiscal imbalances and intertemporal budget constraints in the long term. Auerbach *et al.* (1991) examined how rising pension expenditures disrupt both current deficits and long-term fiscal sustainability. The study further concluded that increased life expectancy and decreased fertility rates have intensified age-related challenges.

Lenney *et al.* (2021) highlighted that unfunded pension liabilities have serious repercussions for fiscal sustainability. Cooley *et al.* (2019) stated that welfare gains can be achieved if governments implement pension reforms. Emerson *et al.* (2019) explained that productive investment spending decreases with the rise in population aging, negatively impacting economic growth. Rouzet *et al.* (2019) explored the challenges posed by the rising old-age dependency ratio for G20 economies and emphasized the need for comprehensive reforms to improve public pension frameworks and healthcare efficiency.

Honda and Miyamoto (2020) examined the relationship between fiscal sustainability and economic growth in aging societies, finding that high levels of public debt weaken fiscal sustainability in such contexts. Hallet *et al.* (2019) identified that public debts and fiscal sustainability are adversely affected by deteriorating demographic trends, suggesting the need for sustainable dynamic adjustment paths to achieve long-term fiscal sustainability. Similarly, Herrera *et al.* (2020) stressed that population aging is negatively impacting fiscal sustainability in the Euro Area.

These studies collectively underscore the importance of pension reforms in economies facing aging-related fiscal pressures.

Nerlich and Schroth (2018) examined how a decrease in labor supply and an increase in demand for services are creating macroeconomic and fiscal challenges for the Euro region. The study proposed that these issues can be addressed by increasing the retirement age.

Several studies, including Rother *et al.* (2013), Angrisani *et al.* (2004), Fehr and Habermann (2006), Blake and Mayhew (2006), Nannestad (2007), and Pianese *et al.* (2014), emphasized that the rising old-age dependency ratio has serious implications for fiscal sustainability. Dolls *et al.* (2017) recommended that increasing the statutory retirement age can help overcome fiscal challenges caused by population aging. Similarly, Afflatet (2018) found that public debt is rising due to population aging in 18 European countries. The study highlighted that this issue can be addressed through the pay-as-you-go pension system.

Heer *et al.* (2020) explored the impact of high dependency ratios on fiscal sustainability using an overlapping generations life-cycle model. The study analyzed data from the United States and 14 European countries and suggested that the sustainability of pension systems can be improved through policy interventions. These interventions include increasing the retirement age, decreasing pension contributions, and implementing fractional funding consumption taxes.

Wahab *et al.* (2017) observed that unfunded pension liabilities have a positive impact on demographic change in Pakistan, both in the short and long term. Atif (2021) stressed that excessive increases in pension expenditures have affected fiscal sustainability, and it will be difficult for the government to control pension bills in the future. Therefore, pension reforms are required to achieve fiscal sustainability and overcome fiscal deficits (Ahmed *et al.*, 2021).

Although the global literature has explored the impact of increased pension expenditures on fiscal sustainability, there is a lack of studies examining this relationship specifically for Pakistan. The current study aims to address this gap by empirically analyzing the impact of rising pension expenditures on the primary balance of Pakistan.

3. THEORATICAL MODEL

The intertemporal budget constraint obtained from the budget identity is as follows:

$$PL_t - PL_{t-1} = r_t PL_{t-1} + G_t - R_t \quad (1)$$

where,

PL_t are the public liabilities at time t

r_t is the interest rate on public liabilities in time period t-1

G_t is the government spending in time t

R_t is the government revenues in time t

In eq 1, $G_t - R_t$ referes to the primary balance. Primary deficit occurs when spending is more as compared to the revenues. $r_t PL_{t-1} + G_t$ represents the total government spending in time t. This can be simplified to eq. 2 following the study of Quintos (1995) and Gatak and Sanchez-Fung (2007).

$$PS_t = \alpha + \beta PL_t + \varepsilon_t \quad (2)$$

where;

PS_t is the primary budget surplus to GDP ratio in time t (alternatively deficit to GDP ratio with negative sign)

PL_t is the debt to GDP ratio in time t

Bohn (1998) proposed an approach to test debt sustainability to determine the government's ability to meet the intertemporal budget constraint by taking suitable measures. The derived policy rule or fiscal reaction is consistent with rational behavior. The equation suggested by Bohn (1998) is as follows:

$$PS_t = \alpha_0 + \alpha_1 PL_{t-1} + \varepsilon_t \quad (3)$$

The primary budget surplus is regressed on the lagged debt-to-GDP ratio. According to Bohn (1998), this implies testing the significance of α_1 to determine fiscal sustainability. If α_1 is positive and statistically significant against the alternative hypothesis, fiscal policy is considered solvent in the long run. The economic intuition behind this is that higher revenues counterbalance higher public debt, leading to an increase in government surpluses. Fiscal sustainability cannot be achieved unless the previous accumulation of public debt is offset by the rising surplus in the current period.

The impact of the debt-to-GDP ratio on the primary budget surplus is examined. As per Bohn (1998), this regression tests the significance of α_1 to assess fiscal sustainability. If the coefficient is positive and statistically significant in relation to the alternative hypothesis, it indicates that fiscal policy is sustainable in the long run. This suggests that the burden of rising public debt can be managed with higher government surpluses to maintain fiscal balance. Hence, fiscal

sustainability can only be achieved when the accumulated public debt from previous periods is counterbalanced by rising surpluses in the current period.

Equation 3 is extended by including other determinants of the surplus-to-GDP ratio, as pointed out by Barro (1979) and Barro (1986). Following Barro's tax smoothing model, fiscal policy is based on permanent government expenditures (G) and the level of debt. The fiscal reaction function is as follows:

$$PS_t = \alpha_0 + \alpha_1 PL_{t-1} + \alpha_2 G_t + Z_{t,i} + \varepsilon_t \quad (4)$$

Here, Z represents the set of control variables, which are the other determinants of the budget balance (Beqiraj *et al.*, 2018). Bohn (1998) includes these determinants in the error term.

The key focus of this study is to examine the relationship between the primary budget (deficit) and government expenditures (G), specifically pension expenditures, total public debt, and other determinants such as growth and financial development.

4. DATA AND METHODOLGY

4.1. Data

To examine the impact of pension expenditures on the primary deficit, controlling for key macroeconomic variables, we use annual time series data for Pakistan at the federal level, covering the period from 2000 to 2020. Data for the primary deficit, pension expenditures, and total public debt-to-GDP ratio have been extracted from the Economic Survey reports, while data for growth and financial development have been taken from the World Development Indicators (WDI).

4.2. Methodology

4.2.1. The Augmented-Dickey Fuller (ADF) Unit Root Test

Any econometric estimation technique to be applied depends on the nature and properties of the data. Primarily, unit root testing is required because the selection of any econometric procedure for time series data depends on the stationary properties of the variables. The Augmented Dickey-Fuller (ADF) test is a commonly used unit root test because of its wide application. Dickey and Fuller developed the ADF test, which is an extension of the Dickey-Fuller (DF) unit root test with the addition of lagged values of the dependent variable. The purpose of adding lagged terms in the ADF test is to make the error terms serially uncorrelated (Nkoro & Uko, 2016). The criteria for determining the lag length of additional terms are based on the Schwartz Bayesian Criterion (SBC)

and Akaike Information Criterion (AIC). The basic equation of the ADF unit root test presented by Sahin (2016) is as follows:

$$\Delta X_t = \lambda X_{t-1} + \sum_{t=1}^{p} \beta_t \, \Delta X_{t-1} + \varepsilon_t \quad (5)$$

The null and alternative hypotheses specified by Dickey and Fuller are:

H_0: $\gamma = 0$ (i.e. series is non-stationary, series possess the property of unit root, or it is randomly trended, etc.)

H_1: $\gamma < 0$ (i.e. series don't have the problem of unit root or has more deterministic trend)

4.2.2 The Auto-Regressive Distributive Lag (ARDL) Model

After the unit root testing, if the variables do not have the same order of integration and exhibit a mix of I(0) and I(1), the Auto-Regressive Distributed Lag (ARDL) model technique is used for empirical investigation. In the ARDL framework, the econometric model is as follows:

$$\begin{aligned} \Delta PD_t = \alpha_0 + \sum_{i=1}^{\rho_1} \alpha_1 \, \Delta PD_{t-i} + \sum_{i=0}^{\rho_2} \alpha_2 \, \Delta PE_{t-i} + \sum_{i=0}^{\rho_3} \alpha_3 \, \Delta G_{t-i} \\ + \sum_{i=0}^{\rho_5} \alpha_4 \, \Delta FD_{t-i} + \sum_{i=0}^{\rho_6} \alpha_5 \, \Delta Debt_{t-i} + \beta_1 PD_{t-1} \\ + \beta_2 PE_{t-1} + \beta_3 G_{t-1} + \beta_4 FD_{t-1} + \beta_5 Debt_{t-1} + \varepsilon_t \quad (6) \end{aligned}$$

where, $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ are the coefficients attached with the first difference operator that captures the short-run dynamics. While $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ shows the long-run association among variables. The Cointegration technique assures the existence of long-run association among variables and the ARDL Bound test analyzes this long-run relationship. There are various other procedures to assess the long-run relationship between variables but ARDL has advantages over other tests because of its application in a situation where the variables are I(0) and I(1) or a mix of both and it provides relatively efficient results if the data size is finite (Nkoro & Uko, 2016). So, under bound testing the null hypothesis of no cointegration ($\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$) is tested against the presence of cointegration among variables i.e. alternative hypothesis ($\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq 0$). Once the long-run relationship is established, the econometric model under this study is as follows:

$$PD_t = \beta_0 + \sum_{i=1}^{\rho_1} \beta_1 PD_{t-i} + \sum_{i=0}^{\rho_2} \beta_2 PE_{t-i} + \sum_{i=0}^{\rho_3} \beta_3 G_{t-i} + \sum_{i=0}^{\rho_5} \beta_4 FD_{t-i} + \sum_{i=0}^{\rho_6} \beta_5 Debt_{t-i} + \varepsilon_t \quad (7)$$

The second step is to assess the short-run relationship between the primary deficit, pension expenditure, and key macroeconomic variables using the Error Correction Term (ECT). Therefore, the ECT equation is as follows:

$$\Delta PD_t = \alpha_0 + \sum_{i=1}^{\rho_1} \alpha_1 \Delta PD_{t-i} + \sum_{i=0}^{\rho_2} \alpha_2 \Delta PE_{t-i} + \sum_{i=0}^{\rho_3} \alpha_3 \Delta G_{t-i} + \sum_{i=0}^{\rho_5} \alpha_4 \Delta FD_{t-i} + \sum_{i=0}^{\rho_6} \alpha_5 \Delta Debt_{t-i} + \theta_1 ECT_{t-1} + \varepsilon_t \quad (8)$$

Where θ refers to the speed of adjustment and measures the correction of disequilibrium. Here, we expect a negative sign between the ECM and the dependent variable because the negative sign indicates convergence toward equilibrium, while the positive sign indicates divergence from equilibrium. A negative sign suggests that the primary deficit is moving back toward equilibrium (correction). This means any imbalance is being reduced over time, reflecting stability. A positive sign, on the other hand, would suggest that the primary deficit is moving further away from equilibrium (divergence), indicating instability.

5. Results & Discussion

5.1. Descriptive Statistics

Descriptive statistics have been tabulated to provide a summary of the relevant set of observations. It gives precise information about the variables used in the model. Additionally, descriptive statistics help to describe, examine, and interpret the data. Table 2 presents the mean, median, maximum, minimum, and standard deviation of all the variables.

Table 2: Descriptive Statistics

Variables	Obs.	Mean	Median	Maximum	Minimum	SD
Log(PD)	21	5.5420	5.4843	6.7368	3.7977	0.6386
Log(PE)	21	4.6662	4.5293	6.1527	3.3032	0.9360
Growth	21	4.0727	4.3964	7.5468	0.5255	1.9151
FD	21	20.474	19.612	28.602	15.305	4.3164
Total Debt to GDP	21	67.200	61.200	87.600	54.300	11.036

SD= Standard Deviation
PD= Primary Deficit
PE= Pension Expenditure

The total number of observations is 21. Pension expenditure, one of the major determinants of rising government expenditure, has a mean value of 4.66 in the summary statistics, indicating that, on average, pension expenditure is 4.6 billion for a fiscal year.

5.2. Unit Root Testing

The unit root testing of the variables is conducted using the ADF unit root test. Table 3 reports the stationarity of all the variables used in this study. Both the primary deficit and the debt-to-GDP ratio are stationary at levels, rejecting the null hypothesis at a 5% significance level. Meanwhile, pension expenditure, growth, and financial development are stationary at the first difference.

Table 3: ADF Unit Root Test

Variables	Level		First Difference	
	t-stat	p-value	t-stat	p-value
Log(PD)	3.7948	0.0103	-	-
Log(PE)	0.3601	0.9752	7.2300	0.0000
Growth	1.7137	0.4096	3.9995	0.0070
FD	0.8649	0.7779	2.9963	0.0053
Total Debt to GDP	2.9796	0.0050	-	-

5.3. ARDL Results

The order of integration of the variables is different, so we will proceed with the most appropriate estimation technique, i.e., the ARDL approach. Table 4 below reports the results of the long-run ARDL equation (7).

Table 4: Long Run ARDL Results

Regressor	Coefficients	t-stat	p-value
Log(PE)	3.8257	3.5979	0.0228**
First Lagged Log(PD)	0.0259	0.1732	0.8709
Second Lagged Log(PD)	-0.8558	6.0128	0.0039***
Growth	-0.3812	4.3440	0.0122**
FD	0.0901	1.2312	0.2857
Total Debt to GDP	-0.0704	2.3437	0.0791*
R-squared 0.9518	DW-statistics 3.1477		F-stat prob. 0.0535

*** For 1% level of significance, ** for 5% level of significance and * for 10% level of significance

PD= Primary Deficit
PE= Pension Expenditure
FD= Financial Development

The optimal lag length for the model is determined by the minimum AIC. The best-fitted model turns out to be (2, 2, 2, 2, 2, 2, 2). The main regressor, pension expenditure in this study, is positive and significant. A 1% increase in pension expenditure at the national level, on average, increases the primary deficit by 3.82%. This result aligns with Bohn's prediction that a deficit should increase in response to a rise in government expenditure, while conversely, a surplus should decrease as government expenditures grow. An increase in pension expenditure deteriorates the primary balance by increasing the deficit to the point where the government's ability to meet its promised expenditures diminishes, ultimately adversely impacting fiscal sustainability.

The total debt-to-GDP ratio is negative and statistically significant at the 10% level of significance. The existence of a negative relationship between the budget deficit and the debt-to-GDP ratio, as explained by Bohn (1998), shows that fiscal policy in Pakistan is sustainable. A 1% increase in the debt-to-GDP ratio decreases the primary deficit by 0.07%. The magnitude of the coefficient is very small, which indicates the existence of sustainability in its weakest form. This result aligns with the study of Chandia and Javid (2013). The growth coefficient is negative and statistically significant. A 1% increase in GDP growth decreases

the primary deficit by 0.38%. This result is consistent with the study of Farajova (2011). Neo-classical economists are of the view that there exists an inverse relationship between the budget deficit and economic growth (Rana & Wahid, 2017; Nkrumah *et al.*, 2016). With a growing economy, more economic activities are generated, which will increase government revenues. These revenues will help lower the primary deficits and shift towards surpluses in the long run. The coefficient of financial development is positive but insignificant. The first lagged value of the dependent variable is positive and insignificant, while the second lagged value is negative and statistically significant. The significance of this second lagged value indicates the highest primary deficit in that single year compared to the 5 years.[1]

Weak fiscal sustainability poses various challenges for Pakistan, including mounting debt levels, decreasing fiscal capacity to fund critical expenditures, and greater vulnerability to economic shocks. All these factors may result in increased borrowing costs, the crowding out of private investment, and a decrease in investor confidence. Consequently, these factors contribute to impeding economic growth and development. Persistent fiscal imbalances can also affect the government's ability to fulfill long-term commitments, such as pensions and social security. As a result, social disparities may escalate.

The government is required to introduce pension reforms to mitigate the fiscal burden; however, these changes need to be equitable. The reforms should avoid disproportionate impacts on vulnerable groups, such as low-income households and women. The reforms generally involve trade-offs between current and future generations. However, ethical considerations should be made to ensure that the reforms do not unduly burden future generations while protecting benefits for current generations.

Other countries have also faced the challenge of pension burdens and fiscal sustainability, for which various measures have been initiated. For instance, India introduced Defined Contribution (DC) Schemes (DCS) for public employees in 2004 to reduce its pension bill. Costa Rica financed its pension expenditures by applying sales tax, alcohol and tobacco taxes, and other sources. In Greece, pension expenditures contributed significantly to the fiscal crisis, with high replacement rates and extensive benefits leading to unsustainable debt levels. As a result, the government introduced structural reforms, reducing pension benefits and increasing the retirement age.

[1] 'Primary deficit disorder' The News, 2021, https://www.thenews.com.pk/magazine/money-matters/772214-primary-deficit-disorder

5.4. ARDL Bound Test & ECT Results

The ARDL Bound test examines the long-run relationship between dependent and explanatory variables. Table 5 shows that the value of F-statistics is 13.1577 greater than the upper limit critical value at a 5% level of significance.

Table 5: ARDL Bound Test

Test Statistic	Value	Significance	I(0)	I(1)
Asymptotic n=1000				
F-statistic	13.1577	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Based on the value of the F-statistic, the null hypothesis of no cointegration is rejected. Thus, the variables are integrated, and there exists a long-run relationship between them.

Table 6: Short Run ARDL Results

Regressor	Coefficients	t-stat	p-value
dLog(PD(-1))	0.8558	9.1414	0.0008
dLog(PE)	3.8257	9.0676	0.0008
dLog(PE(-1))	4.3753	10.4432	0.0005
dGrowth	-0.3811	10.4461	0.0005
dGrowth(-1)	-0.0112	0.2982	0.7803
dFD	0.0901	3.1021	0.0361
dFD(-1)	0.0003	0.0100	0.9925
dTotal Debt to GDP	-0.0704	5.9471	0.0040
dTotal Debt to GDP(-1)	0.0262	2.1338	0.0998
ECM(-1)	-1.8290	13.3278	0.0002**
R-squared	DW-statistics		F-stat prob.
0.9733	3.1477		0.0000

PD= Primary Deficit
PE= Pension Expenditure
FD= Financial Development

Table 6 reports the ECT in eq. 8, which is negative and significant at the 5% level of significance, indicating convergence towards equilibrium. The larger the error correction coefficient (in absolute value), the faster the return to equilibrium will be once any shock hits the economy.

5.5. Diagnostics Testing

The diagnostic testing of the ARDL model is reported in Appendix A. Table A1 demonstrates that the model is free of serial correlation, accepting the null hypothesis of no serial correlation at the 5% level of significance. Table A2 confirms that the model is free of specification errors by applying the Ramsey RESET test. The coefficient's stability is tested by the CUSUM and CUSUM squared graphs shown in Figs. A1.1 and A1.2, respectively. The graphs indicate the stability of the model as the blue line lies within the critical lines.

6. CONCLUSION AND POLICY RECOMMENDATIONS

The government's inability to manage financial responsibilities gives rise to the issue of fiscal sustainability. The mismatch between revenue and expenditures is covered by public debt; however, the excessive accumulation of debt affects both current and future generations. International examples show that a debt burden can create fiscal pressure, pushing countries toward default. Pension expenditures also challenge fiscal sustainability, and the growing pension liabilities are creating pressure even for developed countries. With the large debt burden and rising pension liabilities, Pakistan is also facing the challenge of fiscal sustainability.

This study utilizes Bohn's (1998) derived fiscal reaction function to determine whether the government is implementing necessary measures to adhere to the intertemporal budget constraint. The results show a negative relationship between the budget deficit and the debt-to-GDP ratio, indicating the sustainability of fiscal policy, albeit in its weakest form. The small coefficient of public debt suggests the presence of fiscal sustainability, but in a fragile state. This finding aligns with Bohn's prediction. The equation is then extended by incorporating government expenditure and other determinants, following Barro's tax smoothing model. The change in government expenditure, specifically the rise in pension expenditure, is estimated in this study using the ARDL model covering the period from 2000-2020. The results indicate a further deterioration of the primary balance due to increasing pension expenditures. These rising pension costs will ultimately undermine fiscal solvency, pushing the economy to a point where the government will fail to meet its obligations. The ARDL bound test confirms the long-run relationship between the variables and suggests that fiscal policy is reactive to debt, with debt continuing to accumulate due to rising pension expenditures.

To achieve fiscal sustainability, the government must implement pension reforms. Although a Pension Reforms Commission has been established, no concrete recommendations have been made. The commission should also focus on options to finance accumulated liabilities and ensure proper reporting and

accounting of pension liabilities for state-owned enterprises. Many countries have established pension funds to manage their liabilities by investing in equities, bonds, and real estate (Ahmed *et al.*, 2021). The federal government could adopt a similar strategy, which would help manage pension liabilities and create space for fiscal sustainability.

Freezing basic pay to overcome the impact on pension expenditures, divesting government assets to fund pensions, decreasing administrative incompetence, streamlining eligibility criteria, and offering cash buyouts to active pensioners are some of the measures that can help control the rapidly increasing pension expenditures and their impact on fiscal sustainability. Eligibility criteria for pension and survivorship benefits should also be revised through pension reforms. Appropriate changes in the retirement age or required service period for early retirement can also be made. These changes can help achieve long-term fiscal sustainability by controlling pension expenditures and promoting longer workforce participation. A contributory pension scheme is a viable option, where the government should transition from defined benefit to defined contribution plans.

Effective debt management methods, including restructuring and consolidating public debt, are required to maintain sustainable debt-to-GDP ratios and attain fiscal sustainability. Furthermore, institutional reforms are needed to strengthen fiscal governance frameworks, achieve transparency, and improve accountability. These measures can help establish policy credibility and promote public confidence in fiscal management.

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Appendix A

Table A1. Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	4.953567	Prob. F(2,22)	0.1680
Obs*R-squared	15.80864	Prob. Chi-Square(2)	0.0004

Table A2. Ramsey Reset Test

	Value	df	Probability
t-statistic	0.3501	3	0.7494
F-statistic	0.1226	(1,3)	0.7494
Likelihood ratio	0.7611	1	0.3830

Figure A1.1

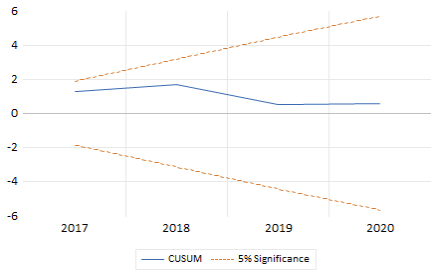

Figure A1.2