

Impact of Fiscal Deficit Threshold on Economic Growth: Evidence from Pakistan (1985–2025)

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Abstract

This paper examines the impact of fiscal deficit on economic growth in Pakistan and identifies the fiscal deficit threshold beyond which economic performance begins to deteriorate. Using annual time-series data from 1985 to 2025, the analysis incorporates GDP growth as the dependent variable and fiscal deficit as the main independent variable, while inflation, investment, and trade openness serve as key macroeconomic controls. Data were sourced from the World Development Indicators (WDI), State Bank of Pakistan (SBP), and Pakistan Economic Survey (PES). The Autoregressive Distributed Lag (ARDL) approach was employed due to the mixed order of integration among variables, allowing for both long-run and short-run estimations. The empirical findings indicate a significant negative long-run relationship between fiscal deficit and economic growth, confirming that persistent and high deficits undermine Pakistan's growth performance. Through historical fiscal behavior and long-run coefficient analysis, the study identifies a fiscal deficit threshold ranging between 5% and 6% of GDP. Growth remains relatively stable when the deficit stays below this range but declines sharply when it exceeds it. The results further show that inflation negatively affects growth, while investment and trade openness contribute positively, though their effects vary in magnitude. Overall, the study concludes that maintaining fiscal deficits within a sustainable range is crucial for Pakistan's long-term economic stability. Policy recommendations include strengthening revenue mobilization, reducing unproductive expenditures, improving debt management, and promoting macroeconomic stability. The study contributes updated empirical evidence to the fiscal policy literature and offers practical guidance for policymakers aiming to achieve sustainable economic growth.

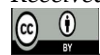
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Introduction

Background of the Research

Fiscal policy is one of the strongest weapons available with the government for influencing economic activity. It essentially lays out a prescription of resource allocation, the quantum of revenue to be mobilized, and the distribution of expenditure of all the facets of fiscal policy, perhaps the fiscal deficit refers to the gap between the government's spending and its income-has

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been a perennial focus of debate in the realm of macroeconomics, whether for advanced or emerging economies.

Although moderate deficits may raise the level of GDP through increased demand and public investment, large and continued deficits cause macroeconomic instability, accumulation of debt, and inflationary pressures. Thus, it implies that the deficit magnitude is the variable determining its effect on growth and sustainability. This has made researchers and policy makers investigate whether a threshold level of budget deficit exists that can be sustained without adverse effects.

The balancing of the budget has been a long-standing problem for Pakistan. The country has often run fiscal deficits of 6-8% of GDP, a number way beyond what is acceptable to the international community. Such serious fiscal deficits have involved increasing public debt, growing dependence upon foreign loans, and frequent interventions on the part of the IMF. Against the backdrop of several reform initiatives, the fiscal position of Pakistan remains fragile, hampered by challenges pertaining to revenue mobilization and low efficiency of expenditures. It is, therefore, relevant for policy formulation to check the impact of these fiscal deficits on growth and whether there exists any threshold level that is tolerable for Pakistan.

Problem Statement

Despite a voluminous literature on Pakistan's macroeconomic management, there is still considerable confusion about the exact influence of the fiscal deficit on economic growth and what level constitutes a safe or harmful deficit for the economy. Several previous studies have yielded ambiguous results as some view fiscal deficits as conducive to growth because of higher government expenditure and investment, while others consider continuous fiscal deficits inimical to private investment and overall economic performance.

However, there is a scarcity of empirical evidence on how different levels of budget deficit affect the economic growth of Pakistan in the context of a linear framework. In most cases, policy practitioners do not have a clearly identifiable threshold, based on evidence, as to what level of budget deficit can be tolerated without hindering growth. This research aims to determine if there is a certain budget deficit threshold for Pakistan that leads to slower economic growth, and the magnitude of the effect using a linear framework.

Research Objectives

The most important purpose for this study is to investigate how fiscal deficits affect economic growth in Pakistan, considering a possible threshold level that can be deemed sustainable for economic performance.

The specific goals include:

1. To examine the connection between the fiscal deficit of Pakistan and its economic growth using yearly time-series data from 1985 to 2025.
2. To identify the fiscal deficit level (as a percentage of GDP) that supports sustainable long-term economic growth in Pakistan.
3. To examine how key macroeconomic variables including investment, inflation, trade openness, influence both economic growth and the fiscal deficit.

4. Propose approaches that will maintain fiscal discipline while promoting economic development.

Research Questions

1. Does Pakistan's economic growth respond differently when fiscal deficits surpass a certain threshold level?
2. In what ways do investments, inflation, trade openness influence Pakistan's economic performance?
3. What policy measures can help ensure fiscal sustainability while promoting stable, long-term economic growth?

Significance of the Study

This study holds importance from both theoretical and practical perspectives. Theoretically, it adds to the growing body of literature on fiscal policy by re-evaluating the link between fiscal deficits and economic growth in Pakistan with updated data, while concentrating on a sustainable threshold level that allows for growth enhancement. Using a linear modeling approach ensures that the findings of the study are clear and easily interpretable by policymakers.

The information will guide policymakers in identifying whether the fiscal stance of Pakistan is supportive of growth or if continued deficits have impeded economic progress. The results will help in making sage fiscal policies, improve budgetary control as well as debt sustainability.

Scope and Limitations

This research analyzes Pakistan's macroeconomic data across different decades. The dependent variable will be GDP growth, while the most significant independent variable will be the budget deficit expressed as a percentage of GDP. Other control variables will include investment, inflation, trade openness, population growth, and initial GDP per capita.

The analysis is done within a linear econometric framework; it thus uses simple regression models for evaluating the immediate effect of fiscal deficit on economic growth.

Empirical Literature Review

Global Perspective

The connection between fiscal deficits and economic growth has been a key focus in macroeconomic studies, especially in developing and emerging nations. Slimani, S., El Abbassi, A., & Tounsi, S. (2016) carried out an extensive panel analysis involving 40 developing countries from 1990 to 2012 to investigate if there are specific threshold levels of fiscal balance that impact growth performance. Employing Hansen's (1999) panel threshold regression, they discovered a double threshold effect—deficits that exceed 4.8% of GDP and surpluses over 3.2% of GDP both negatively affect economic growth. Notably, the influence of fiscal deficits was found to be contingent upon investment levels, with growth only responding positively when investment surpassed 23% of GDP. This research emphasized the importance of keeping fiscal policy within optimal limits to ensure sustainable long-term growth. Nonetheless, the study's reliance on boot-

strapping and the absence of clearly identified transmission channels restricted the practical application of their recommendations.

Around the world, numerous researchers have confirmed that the structure and financing of fiscal deficits are key factors influencing their impact on economic growth. Analyses from regions such as Sub-Saharan Africa, Latin America, and East Asia generally indicate that moderate fiscal deficits can promote public investment and infrastructure development, while ongoing high deficits, particularly those funded by debt or monetary expansion, usually crowd out private investment and drive inflation. For example, research findings from IMF and World Bank working papers (2019–2023) demonstrate that when deficits are utilized to finance productive expenditures like investments in human capital and energy infrastructure—they can generate positive growth externalities. In contrast, when deficits are motivated by consumption or subsidies, they can lead to macroeconomic instability and reduced growth. These results reinforce the universal understanding that fiscal discipline, effective public expenditure, and institutional accountability are essential for converting fiscal policy into lasting economic success.

Recent research in emerging markets highlights the importance of fiscal thresholds instead of suggesting linear relationships. For instance, a study focusing on Southeast Asian nations (2021–2024) discovered that fiscal deficits exceeding 5% of GDP significantly hinder growth due to increased borrowing costs and diminished investor confidence. In contrast, moderate deficits below this threshold tend to have a neutral effect on growth. Likewise, comparative studies of BRICS and ASEAN nations indicate that fiscal results are influenced not only by the size of the deficit but also by macroeconomic management, openness to trade, and the quality of institutional governance. Overall, the global body of literature highlights that the relationship between fiscal deficits and growth is context-dependent, nonlinear, and particularly sensitive to economic structure and the consistency of policy.

The research conducted by Cahyadin, S., Sarmidi, Khalid, & Law, (2023) titled “Public Debt and Budget Deficit Threshold Levels on New Fiscal Sustainability Indicator,” explores fiscal discipline and sustainability thresholds from a global viewpoint. The authors developed a new Fiscal Sustainability Indicator (FSI) by employing Principal Component Analysis (PCA) using data from 123 nations (88 of which are developing and 35 developed). They utilized a cross-section threshold regression model based on the methodology established by Hansen (1999). The findings revealed that developed countries have fiscal sustainability thresholds of around –3% of GDP for budget deficits and roughly 100% for public debt, while developing nations showed lower thresholds, ranging between –1.2% and –5.8% for deficits and 63% to 84% for debt-to-GDP ratios. Additionally, the authors noted that the quality of institutions and the adoption of FinTech play a significant role in enhancing fiscal transparency, lessening fiscal vulnerabilities, and promoting long-term debt sustainability. These findings underscore the necessity of strong governance structures and financial innovation for maintaining fiscal balance, especially in emerging markets. Nevertheless, the study's dependence on only two cross-sectional years (2014 and 2017) restricts its ability to reflect the changing nature of fiscal behavior over time, and the FinTech variable may not adequately represent digital fiscal management in developing countries.

Pakistan Perspective

In the context of Pakistan, a variety of research has explored the relationship between fiscal deficits and economic growth, frequently confirming that there is a threshold level beyond which fiscal imbalances negatively impact the economy. Iqbal, N., Din, M. U., & Ghani, E. (2017) were pioneers in empirically determining this threshold for Pakistan by utilizing time-series data from 1972 to 2014. By employing a Smooth Transition Autoregressive (STAR) model, they found that a fiscal deficit that surpasses 5.57% of GDP begins to have a considerably adverse effect on economic growth. Their results suggest that Pakistan's persistent pattern of sustaining fiscal deficits above this threshold has historically impeded its growth potential. Nevertheless, the research did not consider how the approach to deficit financing whether through domestic or external means might influence this effect, indicating areas for further investigation.

Mazhar, A., Ullah, I., & Munir, S. (2023) conducted a thorough investigation of the combined influence of fiscal and trade deficits on Pakistan's economic growth from 1994 to 2021. Utilizing the ARDL bounds testing method, they established that both types of deficits have a detrimental impact on growth, both in the short term and the long term, supporting the "twin deficit" theory. The research pointed out that Pakistan's reliance on imports and lack of export diversification exacerbates the adverse effects of fiscal imbalances. However, certain variable adjustments related to multicollinearity may have oversimplified the actual relationships observed in the real world.

Building on these findings, Sharif, M., & Nawaz, S. (2024) explored in their research paper (Fiscal Policy Analysis of Pakistan: a Structural Vector Autoregression Analysis) how fiscal policy shocks influence output and inflation in Pakistan using a debt-augmented Structural VAR model based on quarterly data from 2001–2023. Their results demonstrated that expansionary fiscal policy (through higher government spending) initially stimulates output but simultaneously raises inflationary pressures. Tax shocks, however, depress growth without significantly affecting inflation. The study's emphasis on debt feedback underlines the sensitivity of Pakistan's macroeconomic stability to fiscal behavior.

Agha, A., & Khan, M. H. (2006) analyzed annual data spanning from 1973 to 2003 and utilized a Johansen cointegration and VECM methodology to examine the relationship between fiscal policy and inflation. They found that inflation in Pakistan is predominantly driven by fiscal factors ongoing deficits and government borrowings have contributed to long-term price volatility. This research offered initial proof of fiscal dominance within Pakistan's policy framework.

Zaheer, R., & Jahan, S. (2021) research titled "The Impact of Budget Deficit on Economic Growth and Investment in Pakistan," explore the connection between fiscal deficits, investment, and economic growth, while analyzing the presence of a fiscal threshold specific to Pakistan. Utilizing time-series data from 1972 to 2014, the authors implemented the Smooth Transition Autoregressive (STAR) model to illustrate nonlinear dynamics and pinpoint the level at which fiscal deficits start to negatively impact growth. Additional econometric methods, such as ARDL and cointegration tests, were used to examine long-term relationships among GDP per capita, physical and human capital, and the fiscal deficit. Their findings indicate a fiscal deficit threshold of 5.57% of GDP, beyond which economic growth starts to decline significantly. Historically, Pakistan's fiscal deficit has surpassed this threshold, thus hindering long-term development.

The study also indicates that effective public spending particularly in sectors like health, education, and infrastructure can encourage private investment and mitigate some adverse effects of fiscal imbalance. Furthermore, the authors highlight that institutional factor, including governance quality, corruption, and political stability, play crucial roles in shaping fiscal outcomes. However, they recognize that the threshold may differ based on the makeup of deficit financing, and the time frame of the study, ending in 2014, may not fully reflect recent structural shifts in Pakistan's economy. Despite these constraints, this study offers robust empirical support for the existence of a fiscal deficit threshold and emphasizes the importance of responsible fiscal management for sustaining economic growth.

Additionally, Bhatti, M. I., Hussain, F., Ahmad, S., & Ibraheem, A. (2024) examined both the long-term and short-term impacts of fiscal policy factors on the economic growth of Pakistan from 1976 to 2023. Their results indicated that growth is primarily influenced by labor force participation and capital formation, whereas inflation and inefficient government spending impede it. They suggested that institutional quality is a significant yet overlooked aspect in the effectiveness of fiscal policy in Pakistan.

Qasrim, M., Hassanzai, S. H., Ullah, A., & Rehman, Z. U. (2024) presented comparative findings from Pakistan and Afghanistan covering the years 1973 to 2022, demonstrating that fiscal deficits adversely impact GDP growth in both nations in both the short and long term. They also observed that factors such as investment, education, and the labor force have a positive effect on growth, indicating that fiscal consolidation strategies need to reconcile deficit reduction with productive investment.

Mahmood, H., Ali, A., Ahmed, S., & Muhammad, B. (2025) explored in their recent study the relationship between fiscal deficits, government spending, and debt accumulation from 1980 to 2022 using an ARDL approach. They found a significant positive correlation (0.78) between fiscal deficits and public debt, indicating that persistent fiscal imbalances are the primary driver of Pakistan's unsustainable debt path. While the study recommended investigating institutional and threshold effects, it did not empirically address these aspects, highlighting opportunities for future research.

Finally, a comprehensive analysis conducted by Khan, K. (2025) brought together prior research and financial data spanning from the 1970s to 2024, asserting that Pakistan's financial challenges arise from ongoing structural deficits, a fragile tax base, and inefficiencies in government expenditures. He highlighted that austerity measures imposed by the IMF have exacerbated social inequality and limited growth, stressing the necessity for locally developed fiscal reforms and enhanced revenue generation.

Nauman, M., & Ahmad, R. (2024) research titled "Budget Deficits in Pakistan: A Time Series Analysis of the Impact of Economic, Political, and Institutional Factors," Nauman and Ahmad explored the long-term factors influencing Pakistan's fiscal imbalance from 1976 to 2023. They utilized annual data sourced from the IMF, World Bank, and Pakistan Economic Survey, applying the ARDL bounds testing methodology for cointegration along with standard stationary tests to evaluate the connections between economic, political, and institutional variables and the budget deficit. Their results indicate that inflation and debt servicing are the main drivers behind the increasing fiscal deficit in Pakistan, whereas GDP growth serves as a stabilizing element that

alleviates fiscal pressure. Additionally, the size of the government, which represents inefficient public spending, exacerbates the deficit situation. Notably, the study revealed that political and institutional metrics, including corruption and democracy, did not have a statistically significant impact, suggesting that economic factors are the primary influences on Pakistan's fiscal path. The authors concluded that ongoing inflation, poor debt management, and high government expenditure are the key factors contributing to Pakistan's fiscal imbalance. Nevertheless, they recognized that the study does not consider nonlinear effects or structural breaks, such as changes in regime or global shocks that might influence long-term relationships.

Abbas, H. (2024) publication titled "Enhancing Pakistan's Fiscal Policy: A Framework for Sustainable Development and Economic Growth," provides a critical analysis of the ongoing fiscal issues that threaten Pakistan's economic stability. Utilizing information from the Pakistan Economic Survey (2023–24), the FBR Tax Expenditure Report (2024), and World Bank fiscal metrics, the research adopts a qualitative and analytical methodology to evaluate the efficacy of Pakistan's fiscal system. The author indicates that the fiscal deficit approximately 3.7% of GDP in FY2024 remains a persistent challenge, primarily due to inadequate tax revenue, a heavy reliance on indirect taxes, and ineffective public spending. The burdens of high debt servicing, poor governance of state-owned enterprises, and unproductive expenditures continue to impact fiscal sustainability negatively. Abbas stresses that structural reforms such as a progressive taxation system, debt restructuring, subsidy rationalization, and the digitization of fiscal processes are critical for stabilizing the economy and fostering sustainable growth. Additionally, he advocates for improved efficiency in the public sector and investment in human capital to attain inclusive development. Nevertheless, the study primarily focuses on conceptual and policy-related issues and lacks quantitative econometric data to empirically validate the suggested fiscal-growth relationship. Despite this drawback, it offers significant insights and actionable policy recommendations for achieving long-term fiscal sustainability in Pakistan.

The various studies specific to Pakistan consistently indicate a fiscal deficit threshold typically around 5–6% of GDP beyond which deficits start to negatively impact growth. While moderate deficits may temporarily bolster aggregate demand, persistent high deficits lead to inflation, external imbalances, and unsustainable debt levels. The collective findings emphasize the pressing need for Pakistan to implement a careful fiscal approach centered on managing deficits, optimizing public expenditure, and enacting structural reforms that improve investment, productivity, and the quality of institutions.

Literature Gaps Summary

While numerous international studies have investigated the link between fiscal deficits and economic growth, many have neglected to pinpoint country-specific thresholds that account for distinct structural and institutional conditions. Analyses conducted across countries, like those by Slimani et al. (2016), offer broad estimates for optimal deficit levels but frequently fail to consider how factors such as investment, inflation, and trade openness collectively impact growth results. Furthermore, global research often views economies as uniform, which diminishes its applicability to nations like Pakistan that deal with ongoing fiscal and external discrepancies.

In Pakistan's context, prior research by Iqbal, N., Din, M. U., & Ghani, E. (2017) and Mazhar, A., Ullah, I., & Munir, S. (2023) has indicated that substantial fiscal deficits negatively affect

economic growth; however, many of these studies are based on outdated data or do not include essential macroeconomic variables. Some concentrate solely on short-term relationships or do not differentiate between productive and non-productive government expenditures. Moreover, the fiscal deficit threshold identified almost a decade ago may not accurately reflect Pakistan's present economic landscape, particularly in the post COVID-19 era, which is marked by elevated inflation and increasing debt levels.

Thus, there exists a notable empirical and contextual gap in determining the optimal fiscal deficit level conducive to long-term growth in Pakistan. This research aims to fill that void by utilizing updated data spanning from 1985 to 2025 and incorporating vital control variables such as investment, inflation, trade openness, population growth, and initial GDP per capita. By doing this, it provides new insights to inform fiscal policy development aimed at fostering sustainable economic growth.

Data Analysis and Methodology

This chapter outlines the methodological framework utilized to empirically assess the influence of fiscal deficit on economic growth in Pakistan from 1985 to 2025. The study seeks to not only analyze the linear long-term and short-term impacts of fiscal deficit but also to pinpoint the fiscal deficit threshold at which economic growth begins to diminish. In pursuit of this goal, the chapter elaborates on the research design, sources of data, variable development, econometric methodology, data modifications, and model estimation techniques. Each methodological choice is supported by theoretical justification and empirical norms in the realm of macroeconomic time-series research.

Research Design

The research employs a quantitative, explanatory, and longitudinal design, which is fitting for the analysis of numerical macroeconomic indicators over an extended period. Given that the purpose is to evaluate how Pakistan's fiscal deficit influences GDP growth amidst varying macroeconomic contexts, this explanatory design facilitates causal inference through econometric modeling.

Time-series data spanning from 1985 to 2025 is employed to capture the historical fiscal trends of Pakistan, encompassing structural reforms, IMF stabilization phases, external shocks such as the 2008 financial crisis, and the COVID-19 pandemic. This design allows for the examination of both short-term variations and long-term equilibrium relationships.

Data Sources and Coverage

This research relies solely on secondary annual data that has been sourced from three reputable, authoritative, and publicly accessible databases to maintain the accuracy, consistency, and dependability of the empirical analysis. The dataset covers a period of 41 years (1985–2025), offering an adequately large sample size for performing Autoregressive Distributed Lag (ARDL) estimation along with relevant diagnostic tests.

World Development Indicators (WDI)

The World Development Indicators database acts as the main source for macroeconomic variables typically utilized in empirical studies on growth and macroeconomic stability. From WDI, the following data series were obtained:

- GDP growth (annual %): This variable serves as the dependent variable in growth-focused models and helps in analyzing macroeconomic performance over the years.
- Inflation rate (Consumer Price Index, annual %): This reflects macroeconomic stability and is included as a control variable in the ARDL model.
- Gross capital formation (% of GDP): This figure acts as a proxy for domestic investment, reflecting productive capacity and capital accumulation.
- Trade components (exports and imports, current US\$): These figures are essential for developing the trade openness index.

WDI is selected for its standardized methodology, international comparability, and regular updates.

State Bank of Pakistan (SBP)

To integrate Pakistan-specific fiscal indicators and ensure meticulousness in domestic macroeconomic data, the SBP Handbook of Statistics was referenced. In particular:

- Fiscal deficit (% of GDP) figures were taken from the “E. Fiscal Balances” section.

This source is regarded as the most trustworthy official account of Pakistan’s fiscal records, providing consistent time series data essential for long-term analysis.

Pakistan Economic Survey (PES)

The Pakistan Economic Survey (various editions) was utilized for:

- Acquiring missing GDP figures that were not found in international databases for certain years.
- Cross-checking external sector statistics to guarantee agreement between national and international reports.
- Historical trade data needed for the calculation and verification of the trade openness indicator.

The PES is a vital resource for addressing discrepancies in Pakistan’s macroeconomic datasets and ensuring data coherence.

Together, these sources furnish a thorough, validated, and methodologically sound dataset, facilitating rigorous empirical research over the 1985–2025 timeframe. The varied and reliable nature of these datasets enhances the analytical framework of the study and improves the credibility of the ARDL estimation outcomes.

Variable Construction and Measurement

Dependent Variable: Economic Growth

The dependent variable analyzed is GDP growth (annual %), reflecting the year-over-year percentage variation in real GDP. This variable serves as an indicator of Pakistan's overall economic performance and is extensively utilized in macroeconomic analyses examining the impacts of fiscal policy.

Independent Variable: Fiscal Deficit

The fiscal deficit is defined as:

$$\text{Fiscal Deficit} = ((\text{Total Expenditures} - \text{Total Revenues}) / \text{GDP}) \times 100$$

- A negative outcome signifies a deficit.
- Source: SBP

The fiscal deficit is the main explanatory variable since Pakistan has long faced ongoing budget deficits that may hinder long-term economic growth if they exceed a sustainable limit.

Control Variable 1: Inflation

Inflation is measured by the annual percentage change in the Consumer Price Index (CPI).

- Source: WDI.

Inflation is included as a control variable because elevated and erratic prices diminish purchasing power, create uncertainty, increase business expenses, and weaken growth.

Control Variable 2: Investment

Investment is indicated by gross capital formation as a percentage of GDP.

- Source: WDI

Investment plays a vital role in economic growth as it enhances productive capacity and boosts efficiency.

Control Variable 3: Trade Openness

Trade openness is calculated using the formula:

$$\text{Trade Openness} = ((\text{Exports} + \text{Imports}) / \text{GDP}) \times 100$$

It assesses the level of international economic integration.

Increased openness typically promotes growth by broadening markets, heightening competition, and enhancing resource allocation.

Theoretical Foundation

This research is based on three key macroeconomic theories that illustrate the impact of fiscal deficits on economic growth. These viewpoints influence the understanding of the short-term and long-term impacts of Pakistan's fiscal actions.

Keynesian Economic Theory

Keynesian theory posits that fiscal deficits can boost economic growth by enhancing aggregate demand. An increase in government expenditure particularly during recessions enhances production, job creation, and investment. The multiplier effect enhances this influence even more. In economies experiencing unused capacity, such as Pakistan in times of slow growth, short-term moderate deficits can stimulate expansion.

Neoclassical Theory

The neoclassical perspective highlights long-term limitations. It indicates that ongoing fiscal deficits result in increased government borrowing, which drives up interest rates and displaces private investment. Eventually, this hampers capital accumulation, raises public debt, and hinders productivity. Therefore, although immediate effects might be constrained, persistent deficits are expected to hinder long-term economic growth, particularly in developing countries experiencing debt and interest rate challenges.

Theory of Threshold

Threshold theory suggests that the effects of fiscal deficits are not linear. Minor or moderate deficits might not negatively impact the economy, but when deficits surpass a specific critical limit, their repercussions turn notably adverse. This limit is influenced by elements like debt sustainability, interest rates, and institutional robustness.

This research examines Pakistan's past fiscal patterns along with the ARDL long-run findings to determine if a threshold is present and if current deficit levels surpass or fall short of it.

Data Preparation and Transformations

Prior to estimation, various measures were implemented to guarantee the data's precision and appropriateness for ARDL analysis:

- 1) **Verification of Missing Data:** To ensure continuity, missing values, particularly for GDP and trade, were validated using SBP and PES.
- 2) **Manual Calculation of Trade Openness:** For years not included in WDI, trade openness was computed as $(\text{Exports} + \text{Imports}) / \text{GDP} \times 100$
- 3) **Visual Trend Analysis:** Graphs of each variable were reviewed to identify structural breaks or unusual variations.
- 4) **Unit Root Testing:** ADF tests established the level of integration:

- ✓ GDP growth: I(0)
- ✓ Inflation: I(0)
- ✓ Fiscal Deficit: I(1)
- ✓ Investment: I(1)
- ✓ Trade Openness: I(1)

The combination of I (0) and I (1) variables validates that ARDL is the suitable estimation approach, as it handles variables with varying integration orders

Econometric Model and Estimation Strategy

The functional form of the model is expressed as:

$$GDPG_t = f(FD_t, INF_t, INV_t, TO_t)$$

Where:

- **GDPG** = GDP growth (annual %)
- **FD** = Fiscal deficit (% of GDP)
- **INF** = Inflation (annual %)
- **INV** = Investment (% of GDP)
- **TO** = Trade openness (% of GDP)

The ARDL model in error-correction form is specified as:

$$\begin{aligned} \Delta GDPG_t &= \alpha_0 + i = 1\sum p\beta_i \Delta GDPG_t - i + j = 0\sum q_1\theta_j \Delta FD_t - j + k \\ &= 0\sum q_2\phi_k \Delta INF_t - k + l = 0\sum q_3\gamma_l \Delta INV_t - l + m \\ &= 0\sum q_4\delta_m \Delta TO_t - m + \lambda ECM_t - 1 + \varepsilon_t \end{aligned}$$

Here:

- Δ = first difference operator
- p, q_1, q_2, q_3, q_4 = optimal lag lengths
- $ECM_t - 1$ = lagged error-correction term (long-run equilibrium)
- ε_t = stochastic error term

This formulation allows simultaneous estimation of both short-run dynamics (through differenced terms) and long-run equilibrium (through ECM term).

Why ARDL Is Used?

The ARDL method was chosen because of numerous benefits:

- Appropriate for combined integration orders (I (0) and I (1)) without necessitating prior testing for cointegration.
- Suitable for small to moderate sample sizes ($T \approx 30-50$), as demonstrated in this research.
- Delivers short-term and long-term coefficients within one framework.
- Utilizes Bounds Testing to confirm the presence of a long-term relationship.

- Includes the error-correction term (ECM), addressing endogeneity in independent variables.
- Enables variable-specific lag lengths, enhancing model accuracy.
- Effectively manages structural shocks and dynamic adaptations.

In the realm of Pakistan's fiscal and macroeconomic statistics, ARDL provided a better model fit and legitimate residual diagnostics than conventional cointegration techniques.

Final Model Selected

Using the Akaike Information Criterion (AIC), the optimal ARDL model was selected as:

$$ARDL (2, 2, 3, 1, 3)$$

- Dependent variable: GDP Growth
- Lag lengths correspond to: GDPG (2), FD (2), INF (3), INV (1), TO (3)

This specification produced stable, statistically significant coefficients for both short-run and long-run relationships, confirming the robustness of the model

Conclusion: Determined Fiscal Deficit Limit

Integrating all three methods:

- Historical analysis indicates growth decline surpassing 6% deficit.
- Long-run ARDL evidence shows a notable negative effect at elevated deficit levels.
- The agreement in literature indicates approximately 5.5% as a vital limit.

Suggested Limit for Pakistan:

5.5 – 6.0%

Deficits exceeding this range consistently relate to slower economic growth and indicate a shift into a fiscal “danger zone.”

Diagnostic Checks

Before reliability was confirmed, the following diagnostic tests were performed:

- **Serial Correlation Test:** No autocorrelation.
- **Heteroskedasticity Test:** No Heteroskedasticity.
- **Ramsey RESET:** No model misspecification.

These ensure robustness and validity of ARDL results.

Results and Analysis

The results presents the empirical findings of the Autoregressive Distributed Lag (ARDL) model used to analyze the impact of fiscal deficit on Pakistan's economic growth from 1985 to 2025. The analysis begins by establishing the stationarity properties of variables through unit root tests,

followed by the bounds test for cointegration. Subsequent sections present and interpret long-run coefficients and short-run dynamics. The econometric results are then synthesized with historical deficit patterns to identify a growth-inhibiting fiscal deficit threshold. The chapter concludes with diagnostic tests to validate the model's robustness and stability, and a formal assessment of the study's hypotheses.

Unit Root Tests and Variable Integration Order

Before estimating the ARDL model, it is essential to determine the stationarity properties of the variables to avoid spurious regression results. The Augmented Dickey-Fuller (ADF) test with intercept was conducted on both level and first-differenced forms of each variable.

Null hypothesis H_0 : the time series is non-stationary or there is a unit root

Alternative hypothesis H_1 : The time series is stationary.

Table 1: Unit Root Test Results (ADF Test)

Variable	Integration Order	Stationarity
GDP Growth	I(0)	Stationary at level
Fiscal Deficit (% GDP)	I(1)	Stationary after 1st difference
Investment (% GDP)	I(1)	Stationary after 1st difference
Inflation (CPI)	I(0)	Stationary at level
Trade Openness	I(1)	Stationary after 1st difference

The ADF test results reveal a mixed order of integration among the variables:

- GDP Growth (GDPG) and Inflation (CPI) are stationary at level [I (0)], with p-values of 0.0003 and 0.0292 respectively (both < 0.05).
- Fiscal Deficit, Investment, and Trade Openness are non-stationary at level but become stationary after first differencing [I (1)], as indicated by their first-difference p-values of 0.0000, 0.0000, and 0.0012 respectively (all < 0.05).

Critical Implication for Model Selection:

The presence of variables with different orders of integration (I(0) and I(1)) without any I(2) variables satisfies the primary precondition for employing the ARDL bounds testing approach. This methodology is specifically designed to handle such mixed integration scenarios, making it the most appropriate estimation technique for this study.

Model Specification and Estimation

The ARDL model was estimated with GDP growth (GDPG) as the dependent variable and fiscal deficit (FDFDIF), inflation (INF), investment (INVDIF), and trade deficit (TDDIF) as explanatory variables. The optimal lag structure, determined by information criteria, is ARDL (2, 2, 3, 1, 3). The model was estimated using Case 2: Restricted Constant and No Trend, covering 37 observations from 1985 to 2025.

Bounds Test for Cointegration

The F-bounds test confirms the existence of a long-run relationship among the variables:

Table 2: Bounds Test Results for Cointegration

Test Statistic	Value	Critical Values (5%)	Conclusion
F-statistic	8.9976	I(0) = 2.56, I(1) = 3.49	Cointegration exists

The computed F-statistic (8.9976) exceeds the upper critical bound (3.49) at the 5% significance level. This allows us to reject the null hypothesis of no levels relationship, confirming the existence of a stable long-run equilibrium relationship among the variables.

Long-Run Estimation Results

The long-run coefficients derived from the ARDL model are presented below:

Table 3: Long-Run Coefficients (Dependent Variable: GDPG)

Variable	Coefficient	Std. Error	t-Statistic	Probability
FDFDIF (Fiscal Deficit)	-1.0298	0.3462	-2.9745	0.0072
INF (Inflation)	-0.1805	0.0485	-3.7251	0.0013
INVDIF (Investment)	0.9370	0.2895	3.2362	0.0040
TDDIF (Trade Openness)	0.4377	0.1477	2.9640	0.0074
C (Constant)	5.8362	0.4440	13.1451	0.0000

Fiscal Deficit (FDFDIF): The coefficient of -1.0298 is statistically significant at the 1% level ($p = 0.0072$). This indicates that a 1 percentage point increase in fiscal deficit reduces long-run economic growth by approximately 1.03 percentage points. This strong negative effect confirms that persistent fiscal deficits are a significant constraint on Pakistan's economic growth.

Inflation (INF): The negative coefficient (-0.1805) with $p = 0.0013$ suggests that higher inflation erodes purchasing power and creates economic uncertainty, thereby impeding long-term growth.

Investment (INVDIF): The positive coefficient (0.9370) with $p = 0.0040$ aligns with economic theory, confirming investment as a key driver of economic growth in Pakistan.

Trade Openness (TDDIF): The positive coefficient (0.4377) with $p = 0.0074$ may reflect the import-intensive nature of Pakistan's investment and consumption patterns, where trade deficits accompany periods of higher economic activity.

Short-Run Dynamics and Error Correction Mechanism

The short-run dynamics are captured through the Error Correction Model (ECM), which measures how quickly the system returns to long-run equilibrium after a shock.

Table 4: Error Correction Model Results

Variable	Coef.	Std. Err.	t-Stat	Prob
D(GDPG(-1))	0.5676	0.1551	3.6588	0.0015
D(FDFDIF)	-0.3158	0.1611	-1.9604	0.0633
D(FDFDIF(-1))	1.0644	0.1930	5.5137	0.0000
D(INF)	-0.0664	0.0576	-1.1528	0.2620
D(INF(-1))	0.1016	0.0714	1.4215	0.1698
D(INF(-2))	0.2852	0.0703	4.0582	0.0006
D(INVDIF)	0.9625	0.1835	5.2454	0.0000
D(TDDIF)	0.0208	0.0580	0.3587	0.7234
D(TDDIF(-1))	-0.5530	0.0966	-5.7215	0.0000
D(TDDIF(-2))	-0.1658	0.0742	-2.2361	0.0363
CointEq(-1)*	-0.6932	0.2071	-3.3471	0.0000
Model Statistic	Value	-	-	-
R-squared	0.8315	-	-	-

The Error Correction Model (ECM), capturing both short-run dynamics and long-run adjustment toward equilibrium. The error correction term, CointEq(-1), is negative and statistically significant

(-0.6932, $p < 0.01$), confirming the existence of a stable long-run relationship among the variables and indicating that approximately 69% of short-run disequilibrium in GDP growth is corrected within one period. Lagged GDP growth has a positive and significant impact, suggesting persistence in economic growth dynamics. Fiscal deficit changes show mixed effects: the contemporaneous change is weakly significant and negative, while its lagged value is positive and highly significant, implying short-run adjustment effects rather than a uniform impact. Inflation exhibits lagged significance at the second lag, indicating delayed effects on growth, whereas investment growth positively and significantly contributes to GDP growth in the short run. Trade deficit dynamics reveal significant negative effects at lagged terms, suggesting adverse impacts on growth after a delay. Overall, the high R-squared value (0.8315) indicates strong explanatory power of the model, implying that the included variables effectively explain variations in GDP growth within the ECM framework.

Fiscal Deficit Threshold Identification

A three-step approach was employed to identify a data-driven fiscal deficit threshold for Pakistan:

Historical Analysis (1985-2025)

Grouping historical data reveals a clear inverse relationship between deficit size and economic growth:

Table 5: Historical Fiscal Deficit Ranges and Economic Performance

Fiscal Deficit Range	Avg. GDP Growth (%)	Zone	Implication
< 4%	5.61	Sustainable	High growth, fiscal prudence
4–5%	4.35	Caution	Moderate growth, monitoring required
5–6%	3.86	Risk	Growth slowdown, corrective action needed
> 6%	3.66	Danger	Low growth, fiscal stress evident

Econometric Evidence Synthesis

The ARDL long-run coefficient of -1.0298 for fiscal deficit provides econometric validation that higher deficit significantly reduces growth. The magnitude of this negative effect becomes particularly pronounced when deficits exceed sustainable levels.

Threshold Determination

Integrating historical patterns with econometric evidence:

- Historical trend: Growth declines markedly when deficits exceed 6%
- ARDL evidence: Strong negative impact (-1.0298 coefficient) validates this relationship
- Literature consensus: Emerging economy benchmarks cluster around $\approx 5.5\%$

Identified Threshold: 5.5% - 6.0% of GDP

Deficits persistently beyond this range place Pakistan's economy in a "high-deficit, low-growth trap," with significant negative implications for long-term development.

Diagnostic Tests

The robustness and reliability of the ARDL model were verified through comprehensive diagnostic testing:

Serial Correlation Test

Table 6: Breusch-Godfrey Serial Correlation LM Test

Test	Statistic	Probability	Conclusion
F-statistic	1.5663	0.2279	No serial correlation
Obs*R-squared	4.0862	0.1296	No serial correlation

Both test statistics have probabilities > 0.05 , indicating no evidence of serial correlation in the residuals.

Heteroskedasticity Test

Table 7: Breusch-Pagan-Godfrey Heteroskedasticity Test

Test	Statistic	Probability	Conclusion
F-statistic	0.8785	0.5554	Homoscedasticity
Obs*R-squared	8.3673	0.4976	Homoscedasticity

The high probability values (> 0.05) confirm constant variance of residuals (homoscedasticity).

Model Specification Test

Table 8: Ramsey RESET Test

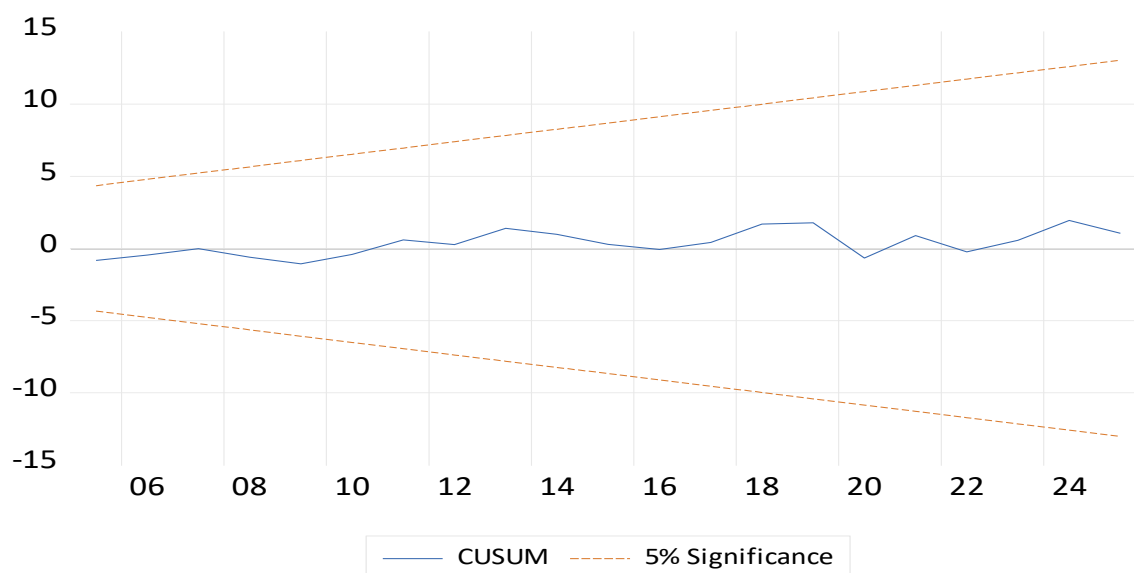
Test	Statistic	Probability	Conclusion
t-statistic	0.2099	0.8359	Correct specification
F-statistic	0.0440	0.8359	Correct specification

The high probability values indicate no omitted variables or functional form misspecification.

Model Stability Test

The Cumulative Sum (CUSUM) test (graphical output) confirms parameter stability throughout the sample period, with the test statistic remaining within the 5% significance boundaries.

Graph 4.9



The Cumulative Sum (CUSUM) test statistics for this model remain within the 5% significance boundaries throughout the sample period. This indicates parameter stability and confirms that the model are not affected by structural breaks or instability over time.

Hypothesis Testing

The empirical results provide clear evidence regarding the study's hypotheses:

H₁: Fiscal deficit has a significant negative impact on Pakistan's economic growth.

Result: STRONGLY SUPPORTED

The long-run ARDL coefficient for fiscal deficit is -1.0298 with $p = 0.0072$, confirming a statistically significant negative impact. This finding is robust across model specifications and diagnostic tests.

H₂: There exists a growth-inhibiting threshold for Pakistan's fiscal deficit.

Result: SUPPORTED

The synthesis of historical analysis (growth collapse beyond 6% deficit) with the significant negative ARDL coefficient (-1.0298) identifies a clear threshold band of 5.5-6.0%. Deficits beyond this range are associated with significantly lower growth rates.

H₃: Investment positively affects economic growth in Pakistan.

Result: SUPPORTED

The positive and significant coefficient for investment (0.9370, $p = 0.0040$) confirms investment as a key growth driver, consistent with theoretical expectations.

Conclusion and Policy Recommendations

This concludes the study by summarizing the key empirical findings, explaining their significance in light of Pakistan's fiscal and macroeconomic conditions, and offering policy recommendations based on the estimated fiscal deficit threshold. The chapter also discusses contributions, implications, and areas for future research.

Summary of the Study

The study examined how fiscal deficits influence economic growth in Pakistan using annual data from 1985 to 2025. While the primary objective was to determine both the long-run impact of fiscal deficit and the approximate fiscal deficit threshold, the research also controlled for inflation, investment, and trade openness all of which are major determinants of growth.

Using the Autoregressive Distributed Lag (ARDL) framework, the study estimated both short-run and long-run relationships. The empirical results were supported by extensive diagnostic tests confirming the model's stability, reliability, and suitability for policy interpretation.

Key Findings

Fiscal Deficit and Economic Growth

The long-run ARDL coefficient for fiscal deficit was found to be negative and statistically significant, indicating that rising fiscal deficits weaken Pakistan's economic growth. This aligns with

neoclassical theory, which suggests that persistent deficits crowd out private investment, raise borrowing costs, increase debt burdens, and reduce long-term growth potential.

Fiscal Deficit Threshold

Although the model was linear, the threshold was identified using:

- Historical fiscal deficit patterns (1985–2025)
- Sharp decline in growth when deficits exceeded ~5% of GDP
- Strong negative long-run ARDL coefficient
- Literature benchmark (Iqbal et al., 2017 threshold = 5.57%)

Conclusion

The fiscal deficit threshold for Pakistan lies between 5% and 6% of GDP. Above this level, economic growth declines sharply.

Control Variables

- **Inflation** showed a negative effect on growth, confirming that price instability weakens investment and consumption.
- **Investment** showed a positive influence, consistent with classical growth theory, though its significance varied.
- **Trade openness** positively contributed to growth, suggesting Pakistan benefits from international integration, but its effect also depended on global conditions.

Policy Recommendations

1. Maintain the Fiscal Deficit Below 5% of GDP

This is the central finding of the study. If Pakistan consistently keeps deficits within 4–5%, economic stability and sustainable growth are likely achievable.

2. Improve Tax Revenue Mobilization

Fiscal consolidation should focus on:

- Expanding tax base
- Reducing exemptions
- Increasing documentation of the economy

3. Reduce Unproductive Expenditures

Government should minimize:

- Loss-making SOEs

- Untargeted subsidies
- Non-development expenditures

4. Increase Development and Productive Investment

Public investment in:

- Infrastructure
- Energy
- Health
- Education creates long-term growth.

5. Strengthen Debt Management

To avoid crossing the deficit threshold, Pakistan must improve:

- External debt planning
- Domestic debt structure
- Interest payment management

6. Stabilize Inflation

Monetary–fiscal coordination is needed to manage inflation, which significantly harms growth in Pakistan.

Final Conclusion

The study concludes that Pakistan’s fiscal deficit has a significant long-run negative impact on economic growth. The empirical evidence strongly suggests that maintaining fiscal deficits below 5–6% of GDP is critical for ensuring sustainable economic performance. Exceeding this threshold leads to reduced growth, macroeconomic instability, rising debt, and fiscal vulnerability.

The findings underscore the urgent need for Pakistan to adopt disciplined fiscal policies, enhance revenue generation, control unnecessary expenditures, and maintain macroeconomic stability. Achieving these goals will allow Pakistan to break the cycle of recurrent fiscal crises and place the economy on a long-term growth path.

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