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Budget Deficit and Inflation: Empirical Evidence from Pakistan

Abstract

This paper is focused on investigating the deficit-inflation model for the purpose of analyzing the impact of fiscal deficit on inflation in Pakistan within the framework of ARDL bounds testing approach to cointegration. Order of integration and the issue of unit root was diagnosed with the help of ADF and PP tests of stationarity. Error Correction Model and Granger Causality test are used for investigating the speed of adjustment and pattern of causality among the targeted variables. Findings reveal that impact of fiscal deficit is inflationary as it helps in boosting the inflation rate in Pakistan. The pattern of causality was diagnosed to be of one-way, running from fiscal imbalances to inflation. Findings propose that government should concentrate on countering the budget deficit by promoting economic growth through utilization of fiscal policies like reduction in public spending and expanding the tax revenue.

Key Words: Budget Deficit, Inflation, ARDL, Pakistan

Introduction

Fiscal deficit and inflation are among the two fundamental pillars and indicators that determine the financial and macroeconomic stability of a country. The central aim of policymakers is always focused on maintaining a moderate level of inflation which is mandatory for attaining a higher level of economic growth. In literature, besides the blessings of inflation, we also find that the curses of inflation are marked inimical for growth and prosperity as it drags down the purchasing power, depreciates the local currency, appreciates the exchange rate and, consequently, causes a sluggish economic growth (Khan, Ahmed & Hyder, 2007; Minhajuddin, Azam & Tariq, 2020, Minhajuddin et al., 2020; Minhajuddin, Gul & Khan, 2021). Keeping in view the significance of inflation, extensive work has been done by the researchers for the purpose of investigating the macroeconomic determinants of inflation. Researchers are of the view that determinants of inflation are like dual

faces of a coin that should be flipped and observed from both sides. One side of this coin is the demand side, known by demand-pull inflation triggered by higher cumulative demand, while the other side of this coin is the cost-pushed inflation side triggered by lower cumulative supply (Chaudhry et al., 2011). Besides these two fundamental causes, we also find some other factors, like economic growth, political stability, foreign debt and even the budgetary composition of government expenditures and revenues, which play a crucial role in the determination of inflation (Tiwari & Herstatt, 2012; Palumbo & Pandolfini, 2020).

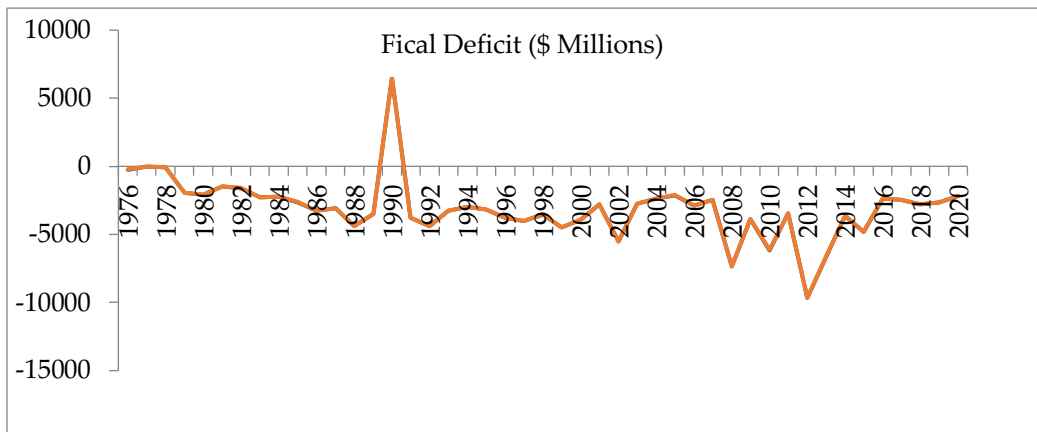
The budget deficit totally depends upon the anticipated value of budgetary compositions and the financial well-being of a country in a given year. Fiscal deficit is among the main causes of higher inflation and downswing of the economies in the underdeveloped regions of the

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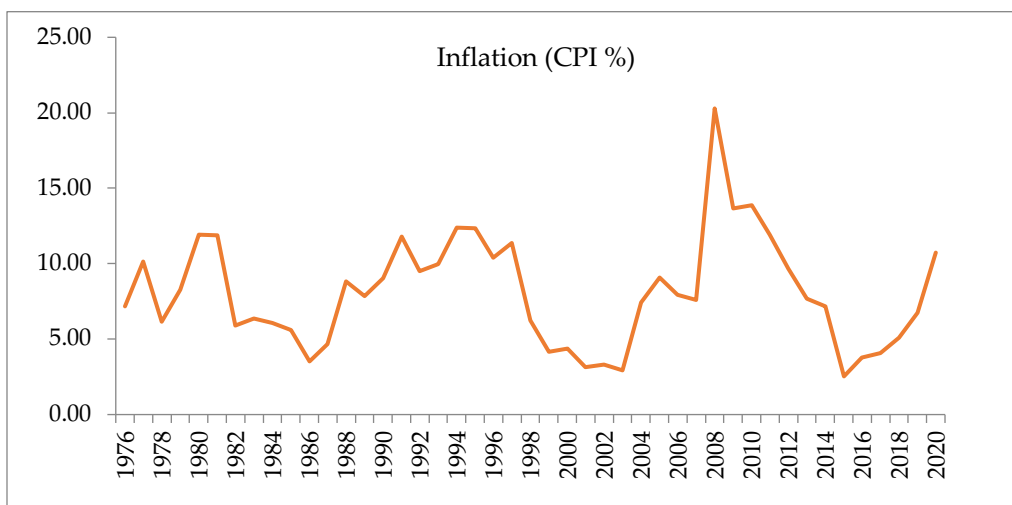
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world. Pakistan is also suffering from a budget deficit persistently since independence. Depiction of both these variables is portrayed in the following three diagrams (Figure 1 & Figure 2).



Graph 1: Budget Deficit (1975-2020)

Source: World Development Indicators (2021)



Graph 2: Inflation Rate (1975-2020)

Source: World Development Indicators (2021)

So keeping in view the importance of budget deficit in shaping the economy, what comes instantly in our mind is the question about the nature of this deficit to be inflationary or anti-inflationary? This question is of serious concern as the deficit is normally covered through debt acquisition from the state bank of Pakistan or even from external sources, which leads to bring

inflationary effect by increasing the availability of money in the market. Several researchers have tried their best to examine the correlation pattern of causality among these two; however, variation and contradiction in their research findings still leave space for new research on this topic. In a little literature, we find that budget deficit is positively associated with inflation ([Darrat &](#)

[Zhong, 2000](#); Sarfraz & Anwar, 2009; [Durguti, 2020](#)). However, few others negate this notion by claiming that this relationship is either negative ([Awe & Olalere, 2012](#)) or there is no relationship between the two ([Bulawayo, Chibwe & Seshamani, 2018](#)). We have not been able to find such a study on this subject that has incorporated all the relevant variables in the deficit-inflation model and have come up with solid results. This study subsidizes the existing compositions of research by examining whether, *first*, the fiscal deficit in Pakistan is inflationary or not, and *second*, the pattern of correlation between these two variables exists or not. This study also aims to extract results-oriented strategies and policy guidelines for effective policymaking related to minimizing the curb of inflation been imposed by the budget deficit.

Arrangement of the remaining paper is made in the following way. Theoretical and empirical literatures are listed in section 2. Section 3 narrates the procedures and approaches towards estimating the links between the two. Scrutiny of the results is recorded in section 4. Conclusions and policy recommendations are characterized in the last section.

Literature Survey

In literature, we find a wide variety of theoretical and empirical debates on the pattern of correlation between these two crucial macroeconomic indicators. Section 2.1 and 2.2 presents a comprehensive summary of this debate.

Theoretical Literature

The two famous schools of thought, Keynesian and Classical economists, consider the inflationary role of fiscal deficit; however there is disagreement in the mechanism through which the impact of change in the budget deficit is transmitted towards inflation over the period. The classical school of thoughts, supporters of the classical theory of inflation, postulates that inflation is the sole cause of fiscal deficit that affects the inflation as countries who permit to run with a constant level of fiscal deficit normally

force the central bank to release more money into the economy that will feed to higher inflation in the future ([Tiwari & Herstatt, 2012](#)). The monetarist economists were in favor of a proportionate effect for the fiscal deficit on inflation. In contrast, Keynesian economists, supporters of the production and employment theories, challenged their stance and argued in favor of the non-proportionate and indirect effect caused by fiscal deficit. They believe that when the economy is at a peak (i.e. full employment) then expansion in budget deficit will tend to raise the real interest rate that will, eventually, crowd out the private investment. Resultantly, the general price level in the economy will start rising accordingly ([Adinevand et al., 2015](#)). Ricardian economists suggest that growth in the fiscal deficit will fail to stimulate demand, as intended by Keynesian economists, in the future. They consider deficit spending as a tax on the future generation that will lead to offset all the macroeconomic effects associated with an increase in fiscal deficit ([Queenan et al., 2000](#)). We also find several other researchers who are denying these routes in favor of no connection for the fiscal deficit with the level of inflation ([Bitzis, Paleologos & Papazoglou, 2008](#)).

Empirical Literature

[Lam et al. \(2000\)](#), in their study for Turkey, found bi-direction causality between fiscal deficit and inflation. [Nair, Parida and Nomura \(2001\)](#) also found similar kinds of results and concluded that inflation is the outcome of fiscal deficit and money supply. For [Bernard and Fischer \(2002\)](#), [New et al. \(2002\)](#), and [Samirkas and Samirkas \(2014\)](#), this effect was found vigorous in the inflationary period and fragile during periods of low inflation. The results of [Catao and Terrones \(2003\)](#), panel study on 107 countries were also somehow similar to the findings of these two researches. [Alavirad and Athawale \(2005\)](#) used the ARDL model and concluded that liquidity and fiscal deficit are the two main causes that affect the inflation rate significantly. [Kesavachandran et al. \(2006\)](#) found that inflation has a positive association with the fiscal deficit.

This finding was contradictory to the findings of [Agha and Khan \(2006\)](#) and [Sahi and Khalid \(2007\)](#) who negated the presence of any pattern of correlation between these two. [Pai et al. \(2008\)](#) and [Rehman and Ahmed \(2008\)](#) also ended with a substantial positive impact for the budget deficit on inflation. On the contrary, one-way causality from fiscal imbalances to inflation was found unclear by [Oladipo and Akinbobola \(2011\)](#).

[Habibullah, Cheah & Baharom \(2011\)](#) and [Samimi and Jamshidbaygi \(2011\)](#), on the other hand, came up with solid arguments in favor of strong association hold by fiscal deficit with the level of inflation. Interestingly, [Tiwari and Tiwari \(2011\)](#) opposed this relationship and concluded that inflation is not the effect of the budget deficit. The public spending and quantity of money were found to be the reasons of growing fiscal imbalances. [Awe and Olalere \(2012\)](#), [Moraa \(2014\)](#), [Jalil, Tariq & Bib \(2014\)](#), and [Mohanty and John \(2015\)](#) concluded that excessive monetization of the fiscal deficit is associated with substantial inflationary effects that harm the growth process unavoidably. [Erkam and Cetinkaya \(2014\)](#) and [Saysombath \(2014\)](#) also investigated this relationship; however, they failed to detect any symbol of a substantial link between the two. [Ishaq and Mohsin \(2015\)](#), [Nguyen \(2015\)](#), and [Zafar et al. \(2016\)](#) also investigated this route and ended with showing a considerable link and association between these two variables.

[Win \(2017\)](#) and [Myovella and Kisava \(2018\)](#) also found that the causality of fiscal imbalances with inflation in Myanmar is bi-directional. They also stressed on the use of appropriate monetary and fiscal policies towards controlling inflation. [Bulawayo, Chibwe & Seshamani \(2018\)](#) used the ARDL bound testing approach towards estimating the impact of fiscal deficit on inflation in Zambia over the period of 1960-2007. However, they also failed to detect any such relationship between these two. Similarly, [Kaur \(2019\)](#) also triggered to investigate this link in India and concluded that money supply and

fiscal imbalances are the root causes of hipper inflation in India. [Hamza, Bhatti & Kiran \(2019\)](#) also tried to investigate this link in Pakistan. They also supported the findings of earlier researchers that fiscal deficit always brings inflationary pressure to the economy. The findings of [Durguti \(2020\)](#) were also in line with this synthesis.

To sum up, differences in the findings of these researchers are mainly due to variation in the nature of economies the analytical framework and mainly due to duration of the analysis. Hence, the presence of controversies in the findings of these studies was a source of inspiration to reinvestigate this topic and come up with solid implications towards effective for policy interventions.

Research Methodology

This study is a mixture of both quantitative and qualitative research. The data period is from 1975 to 2019, while the data source is World Development Indicators (2020).

Model Specification

This study is using the model which has been used by Makochekanwa (2008), [Oladipo and Akinbobola \(2011\)](#), [Awe and Olalere \(2012\)](#), and [Durguti et al. \(2020\)](#) in different countries for the purpose of investigating the association of fiscal deficit with the inflation rate. The ARDL presentation of our model will be:

$$\Delta INF_t = \beta_0 + \sum_{i=1}^n \beta_1 \Delta INF_{t-1} + \sum_{i=0}^n \beta_2 \Delta GDPG_{t-1} + \sum_{i=0}^n \beta_3 \Delta FDI_{t-1} + \sum_{i=0}^n \beta_4 \Delta ER_{t-1} + \sum_{i=0}^n \beta_5 \Delta ED_{t-1} + \sum_{i=0}^n \beta_6 \Delta BD_{t-1} + \sum_{i=0}^n \beta_7 \Delta MS_{t-1} + \sum_{i=0}^n \alpha_8 \Delta PG_{t-1} + \gamma_1 INF_t + \gamma_2 GDPG_t + \gamma_3 FDI_t + \gamma_4 ER_t + \gamma_5 ED_t + \gamma_6 BD_t + \gamma_7 MS_t + \gamma_8 PG_t + \omega_t \dots \dots \dots (1) \text{ Where:}$$

- INF = Inflation as CPI (annual %)
- GDPG= Growth in GDP (annual %)
- FDI= FDI (net inflows as % of GDP)
- ER = Exchange Rate (LC/US\$)
- ED = Stock of External Debt (ED/GNI in %)
- BD = Budget Deficit (BD/GDP in %)

MS = Money Supply (broad money as % of GDP)

PG = Population Growth (annual %)

ω_t = Error term (with zero mean & constant variance)

β_1 to β_8 = Short run coefficients

α_1 to α_8 = Long run coefficients

Statistically, for equation 1, the null H_0 hypothesis of no cointegration will be checked against the alternative hypothesis. Long-term estimates of the model will be analyzed with the help of the ARDL model (i.e., equation 2), whereas short-term estimates will be analyzed through ECM (i.e., equation 3). Mathematically:

$$\Delta INF_t = \lambda_0 + \sum_{i=1}^n \lambda_1 \Delta INF_{t-1} + \sum_{i=0}^n \lambda_2 \Delta GDPG_{t-1} + \sum_{i=0}^n \lambda_3 \Delta FDI_{t-1} + \sum_{i=0}^n \lambda_4 \Delta ER_{t-1} + \sum_{i=0}^n \lambda_5 \Delta ED_{t-1} + \sum_{i=0}^n \lambda_6 \Delta BD_{t-1} + \sum_{i=0}^n \lambda_7 \Delta MS_{t-1} + \sum_{i=0}^n \lambda_8 \Delta PG_{t-1} + \mu_j \dots \dots \dots (2)$$

$$\Delta INF_t = \beta_0 + \sum_{i=1}^n \rho_1 \Delta INF_{t-1} + \sum_{i=0}^n \rho_2 \Delta GDPG_{t-1} + \sum_{i=0}^n \rho_3 \Delta FDI_{t-1} + \sum_{i=0}^n \rho_4 \Delta ER_{t-1} + \sum_{i=0}^n \rho_5 \Delta ED_{t-1} + \sum_{i=0}^n \rho_6 \Delta BD_{t-1} + \sum_{i=0}^n \rho_7 \Delta MS_{t-1} + \sum_{i=0}^n \rho_8 \Delta PG_{t-1} + \zeta ECM_{t-1} + \mu_t \dots \dots (3)$$

ADF and PP tests of stationarity are constructed for the purpose of detecting the order of integration and resolving the issue of a unit root. This study uses the ARDL bound test, which is preferred to other estimation techniques as it avoids the issue of endogeneity and homogeneity (Pesaran & Shin, 1998). The issue of serial correlation and heteroscedasticity are also resolved through the incorporation of the BG-LM test and BPG test in the estimation process. CUSUM and CUSUM square tests are also deployed for the purpose of confirming the stability of our model.

Regression Results

Results comprised on stationarity, followed by the estimates of the ARDL model and ECM model and also by the estimates of different diagnostic tests, are summarized in the subsections of this portion.

Unit Roots Test

Table 1 Depicts that all Variables of the Model are Stationary Either at Level or at First Difference or at Both.

Estimation Techniques

Table 1. Results of the Unit Roots Tests

Variables	ADF Test		PP Test	
	t-Statistic	Decision	t-Statistic	Decision
INF	-4.6517*	At level	-4.7762*	At level
GDPG	-4.2612*	-do-	-4.2826*	-do-
FDI	-3.0311**	-do-	-3.9339*	-do-
ER	-5.3926*	At 1 st Diff	-3.8579*	At 1 st Diff
ED	-5.6501*	-do-	-5.5882*	-do-
BD	-2.9894**	-do-	-2.9028***	-do-
MS	-5.7301*	-do-	-7.0986*	-do-
PG	-13.6301*	-do-	-4.5031	At Level & 1 st Diff

*, **, & *** indicate the level of significance

Cointegration Analysis

Table 2 illustrates that calculated value of F-statistics > L/B & U/B values at 5% & 1% level of

significance. Hence, cointegration is found, and we have to move towards estimates of the ARDL model.

Table 2. F-Bound Test

C/F-Statistics	3.6799	
	L/B	U/B
5 percent	2.32	3.5
1 percent	2.96	3.2

Long-Run Analysis

Table 3 summarizes the resulting coefficients of the proposed model. Coming straight to the point, the coefficient of fiscal deficit magnifies that a one percent change in this variable will

cause approximately 0.26 percent growth in inflation in the long run. Effects of the remaining variables were also found effective except FDI, who was found insignificant. Interestingly, the impact of population growth was found more productive as compared to other variables.

Table 3. Long-Run Results

Variable	Coefficient	t-Statistic	Prob.
(GDPG) _t	0.66980*	2.643	0.01771
(FDI) _t	0.90381	0.917	0.37240
(ER) _t	0.64684*	3.581	0.00252
(ED) _t	0.70945*	4.730	0.00021
(BD) _t	0.26491*	2.918	0.01010
(MS) _t	0.33430***	1.825	0.08673
(PG) _t	1.76093**	2.658	0.01721
C	-58.99991	-3.685	0.00202

*, ** & *** indicate the levels of significance

Short-Run Estimates

Table 4 summarizes these results and indicates that the speed of tuning/convergence from SR-

equilibrium to LR-equilibrium is 49.19%, and it will take two years, approximately, to converge back to the LR-equilibrium.

Table 4. Short Run Results (ECM)

Variable	Coefficient	t-Statistic	Prob.
Δ (GDPG _t)	0.06991	0.444	0.65951
Δ (FDI _t)	0.92853***	2.020	0.05123
Δ (ER _t)	0.12792**	2.502	0.01736
Δ (ED _t)	-0.14615	-0.490	0.62671
Δ (BD _t)	0.03532	0.768	0.44760
Δ (MS _t)	-0.1983	-1.420	0.16472
Δ (PG _t)	0.64413***	1.876	0.06920
Δ (ECM _t)	-0.49197*	-6.128	0.00001

*, ** & *** indicate the levels of significance

Estimates of the Diagnostic Tests, Stability Tests, and Causality Tests

Table 5 presents the summary of different diagnostic tests deployed for the purpose of

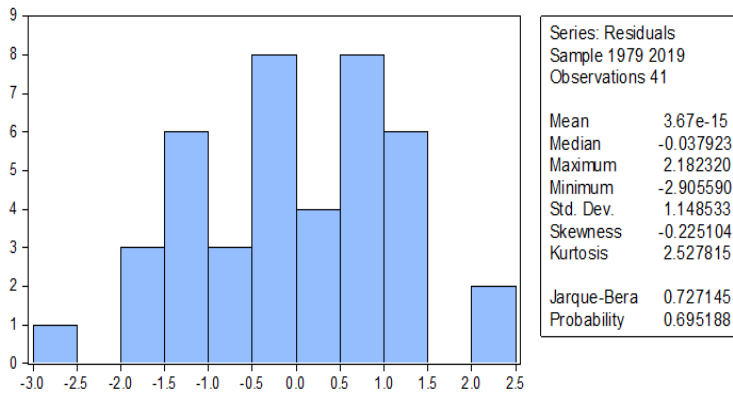
diagnosing the associated issues with the model like the issue of serial correlation, heteroscedasticity, and specification problem. Findings confirmed the absence of all such issues

from the data. Jurque-Bera test also depicted that residuals of the model are normally distributed. Figure 3 is the graphical illustration of this test. The stability of the model was also confirmed by CUSUM test and CUSUM squared test. The summary of these tests are portrayed in Figure 4 and Figure 5. The granger causality test

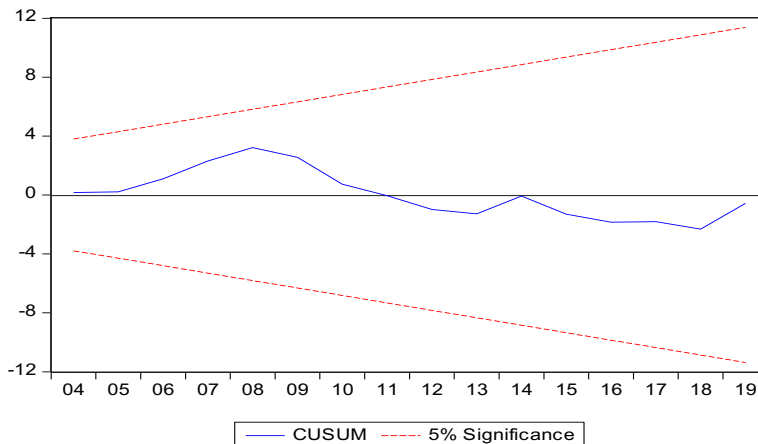
confirmed the presence of one-way causality between fiscal imbalances and inflation rate (i.e, inflation rate => fiscal deficit), and two-way causality between the quantity of money supply and inflation rate. The estimates of this test are gathered in Table 6.

Table 5. Summary of the Diagnostic Tests

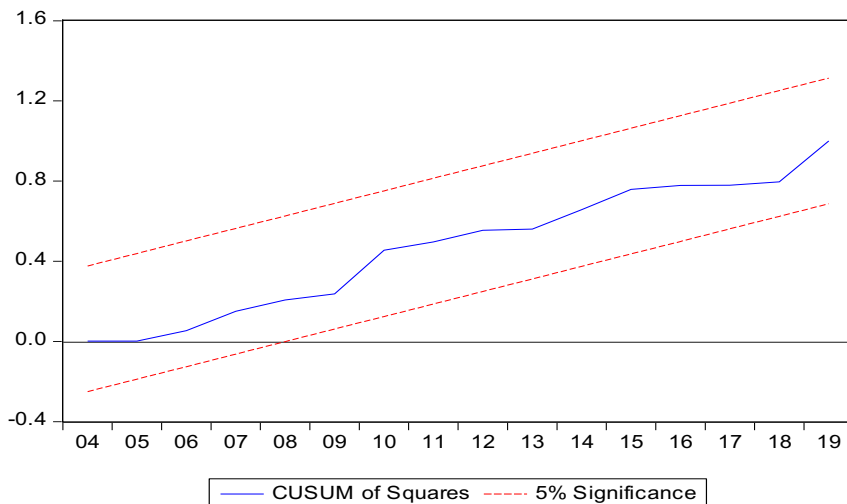
Tests	t-statistics	F-statistics	Outcome
BG (Prob.)		0.62802 (0.44040)	No issue of Serial Correlation
BPG (Prob.)	----	0.81283 (0.6850)	No issue of Heteroscedasticity
Ramsey Test (Prob.)	1.06434 (0.30401)	1.13262 (0.30401)	No issue of specification problem
Jarque-Bera (Prob.)	0.727145 (0.695188)	----	Residuals of the model are normally distributed



Graph 3: Normality of Residuals



Graph 4: CUSUM Test



Graph 5: CUSUM Square Test

Table 6. Estimates of the Granger Causality Test

H ₀	F-Statistic	Prob.
Inf ≠> BD	3.525592***	0.0676
MS ≠> Inf	2.615431***	0.0863
Inf ≠> MS	4.141334**	0.0236

Conclusion and Policy Recommendations

The basic purpose of this research was to analyze the impact of budget deficit on inflation and present results-oriented policy guidelines for effective policymaking in the country. For this purpose, deficit-inflation model was developed within the framework of the ARDL model. ADF and PP tests of stationarity were deployed for examining the issue of unit root. Along with ECM, appropriate diagnostic tests and stability tests were also deployed in this study. Granger causality test was used for investigating the pattern of correlation among the fiscal imbalances, money supply and inflation. Findings revealed that budget deficit helps in boosting the inflation in Pakistan significantly. Speed of adjustment was found to be 49.16 %, which indicates that the economy will take two years to converge back to the long-run

equilibrium. It was also revealed that the pattern of correlation between fiscal deficit and inflation is uni-directional, going from fiscal deficit to inflation. The pattern of causality between money supply and inflation was found bi-directional. Based on the research findings, this study recommends that government should work for controlling/minimizing the budget deficit for maintaining a lower level of inflation, which is mandatory for growth and prosperity of our economy. Beside fiscal deficit, government should also focus on controlling the exchange rate, managing the supply of money, and controlling the population growth as all of them are the factors that affect the rate of inflation in Pakistan. This study also recommends that budget deficit should be countered by promoting the economic growth through utilization of fiscal policies like reduction in public spending and expanding the tax revenue.

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