

## **The Nexuses between Budget Deficit and Price Inflation in Pakistan: An ARDL Bound Testing Approach**

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### **Abstract**

Fiscal imbalances are one of the common economic indicators of developing countries as these countries have a structural weakness on one hand and a strong desire to invest in capital intensive projects that speeds up the pace of development. It has been noticed that in the last couples of years price expansion has slowed down and falling crude oil prices have been the most important factor in slow down price expansion. This study explores the association between inflation and indicators of fiscal imbalances in the first place and second how the choice of financing fiscal imbalances influences price expansion. To explore this connection, a time series data of Pakistan span from 1973 to 2014 have been employed. Different methods of financing fiscal imbalances have been followed, including borrowings and printing of money. The observational discoveries of the paper depict that there is a direct association between inflation and indicators of fiscal imbalances. Every method of financing imbalances is directly and essentially identified with the price expansion within Pakistan. The ARDL bound testing approach is employed to test this relation. Government has to take care of the problem of fiscal imbalances before it becomes more severe and serious.

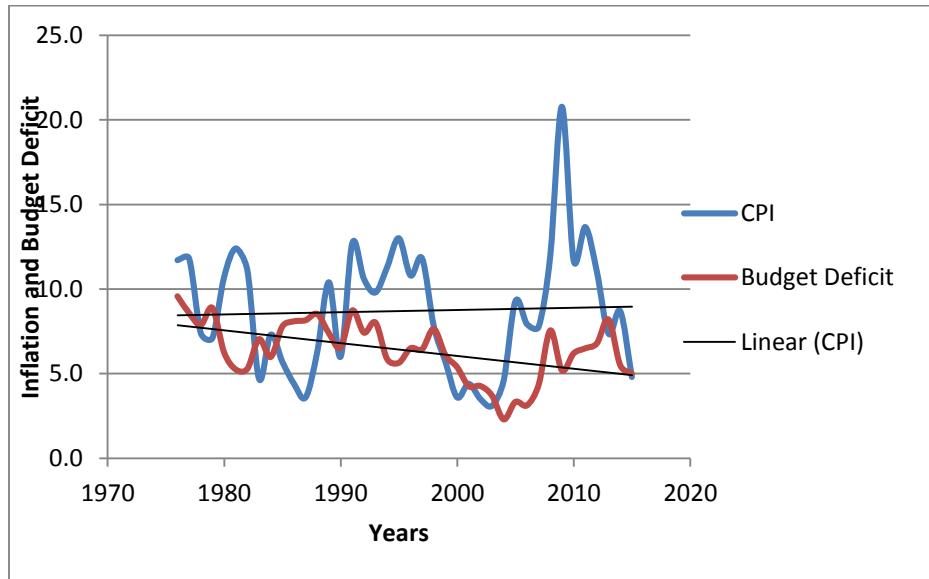
**Keywords:** budget deficit; government borrowing; exchange rate; money supply; inflation.

### **1. Introduction**

The factors that have proved obstacles and undefeated hindrances in the way of achieving sustainable higher growth in the case of Pakistan, the budget deficit and the rapid expansion in prices are showed up at the top. The budget deficit is permanent and consistent phenomenon in the fiscal history of Pakistan. It is contended for a long time

that this fiscal deficit may have assumed a critical part in elucidating overall inflation. Economists try to explain this phenomenon theoretically as well as empirically. It is a very serious task of any central bank to control inflation and ensure macroeconomic stability in the economy, and the same challenges were faced by the State Bank of Pakistan during 90's. As a result of both internal and external factors in 1998 to 2003, prices become more stable and the inflation was averaging 4.6 percent. There are two different time periods when inflation across 20 percent level first is 1973 and the reason is oil price hike and the second is 2008 and the reason is global financial crisis. The economy of Pakistan encountered a relatively moderate inflation in the remaining time period and the average inflation rate is 7.3 percent and the average budget deficit is 7 percent as a percentage of GDP.

Permanent and consistent budget deficit lead to low national savings as well as investment, obstructing development and growth of Pakistan. The average budget deficit of the last ten years is 6 percent. The question arises here is how to finance the average budget deficit for a long time. Economists have proposed two methods of finance this deficit. The first through borrowing, either from foreign sector or domestic sector and the second way to finance through the printing of money or also called deficit financing. Any source of financing these imbalances has posses disadvantages. Borrowings cause the debt burden to increase, which causes the problem of crowding out, increase interest payments and also creates problems in Balance of Payment and which successively causes these imbalances more extreme. Printing of money, directly caused inflation. The budget deficit is not a problem if and only if it create for development and to increase the future productive capacity of the economy. In Pakistan, it is contended that the fiscal deficit is the primary reason behind the high inflation rate and it was also argued that all methods of financing budget deficit are inflationary in nature.



**Figure 1: Budget Deficit and Inflation**

The above figure shows the link between the rate of inflation and the budget deficit as percentage of GDP. The figure shows mix trend of the budget deficit and the rate of inflation in the course of the most recent 40 years. There is no clear association between

the rate of inflation and the budget deficit. The Fiscal Deficits can be inflated or not, it will be confirmed through empirical testing.

The major objective of the study is to examine the long and the short run effect of budget deficit on the inflation in Pakistan employing the annual time series data. So, The study is an attempt to identify the role of the fiscal sector in explaining inflation in Pakistan. And to propose effective policy options for the Government of Pakistan.

The composition of the paper is as follows:

Section 2 demonstrates the review of related literature and the generation of research questions. Section 3 presents the methodological framework as well as specification of the model. Section 4 reveals empirical outcomes and discussion of results. Section 5 presents conclusion and policy recommendations.

## **2. Literature Review and Research Questions**

The public spending that is not fully backed through revenues of the government make a mismatch between spending and revenues and force government to finance these shortfalls to other channels as printing money, borrowing domestically and internationally. As a consequence, there is a higher inflation in the economy.

According to Keynes (1923) an increment in the government budget deficit would lead to a rise in the real rate of interest, which effects in a high general price level and crowding out of private investment. When the government budget deficit is financed by the printing of money, it increases that the aggregate demand, but do not increase the supply of goods, which causes a price spiral.

Those fiscal administrations that are constantly operating at revenue shortfall need to at some point of time succumbed to expanding money supply that creates inflation in the long-term, Sergent and Wallace (1981).

Various studies found only modest and not strong statistical association between government budget and inflation. King and Plosser (1985) studied US and the 12 other nations, but, found no general and critical connection between government budget deficit and inflation.

De Haan and Zelhorest (1990) found that a government budget deficit is modest connected to inflation. While others discovered an inverse connection between inflation and fiscal deficit.

However, the proposition of a direct association between fiscal deficit and inflation is backed through a substantial quantity of research works. Akcay, Alpher and Ozmucur (2001) discovered a direct association between inflation and the government budget deficit. As indicated by research, the funding of shortfall by either notes printing or carrying debt prompts inflation in the long run.

Catao and Terrones (2003) demonstrate that the connection between fiscal deficits and growth in prices is positive and significant. This study employed panel data of 107 countries.

Dabus and Tohme (2003) inspected the connection between money supply and inflation in Argentina of the period 1960 to 2003, in the four different scenarios of general price level: modest, very high, high and hyper-inflation. They discovered that outcomes were depending on the particular scenario nevertheless in all cases inflation was exaggerated by the supply of money, particularly in the hyper-inflation period.

Agha and Khan (2006) investigate the long-run association between fiscal indicators and inflation in Pakistan employing data from 1973 to 2003. The results, using Johansen cointegration analysis, proposed that inflation is not merely connected to the fiscal deficit, but also the foundations of financing fiscal imbalances, presumptuous the effect of exchange rate and real GDP as exogenous.

Serfraz and Anwar (2009) explored the association between inflation and fiscal deficit and how deficit financing impacts inflation. The findings of this study point out that there exists a direct relationship between inflation and fiscal deficit. All the means of deficit financing are directly and positively connected to inflation in Pakistan.

Tiwari and Tiwari (2011) showed that persistent increase in prices is not in any way a reason of government budget deficits. Nevertheless, spending and supply of money are discovered as a significant factor of rising government budget deficit.

The Great Depression and global financial crisis had an adverse impact on the government budget deficit and carried government budgetary policies and inflation to the forefront of discussions. These concerns will increase by growing population needs more government expenditures in coming decades. Leeper and Walker (2012) described various ways in which government budget policy can positively influence inflation and clarifies why these fiscal impacts are complex to notice in time series data.

Lin and Chu (2013) studied the effect of fiscal deficits on inflation and allowed a dynamic change along the Auto Regressive Distributed Lag specification. The results demonstrate that the government budget deficit has a significant effect in high-inflation periods, and has a feeble effect in low inflation periods.

Ishaq and Mohsin (2015) looked into the function of financial as well as monetary institutions in explicating the impact of deficits on inflation. Using panel data for the years 1981 to 2010 the results were according to expectation for eleven Asian economies with generalized movement method. There is a positive association between inflation and fiscal deficits for Asian economies, these economies finances, their deficits primarily by printing of money.

### 3. Methodology and Data

This study employed the annual data span from 1973 to 2014 to investigate the nature of the association between inflation and different indicators of fiscal deficit both in the long and short run. The data were gathered from various issues of Economic Survey of Pakistan (2014-15) and Statistical Year Book 2010. The GDP deflator is used as the dependent variable, whereas, the supply of money, total internal (domestic) borrowings, total external (foreign) borrowings and the exchange rate are taken as the independent variables.

As proposed by numerous theoretical research and empirical studies, we utilize following model:

$$\text{Loggdpdef} = F(\text{Loggdpdef}, \text{Logexchrate}, \text{Logdebdom}, \text{Logdebfore}, \text{Logm2}) \quad (1)$$

Where Loggdpdef is the log GDP deflator, a measure of inflation, Logexchrate is the log of exchange rate, Logdebdom is the log of domestic public debt, Logdebfore is log of foreign public debt and Logm2 is the log of the supply of money.

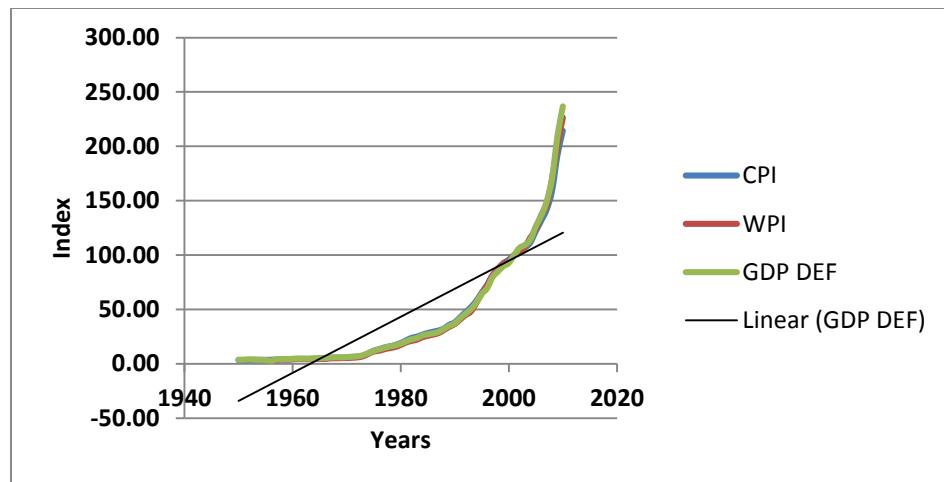
As the time series data is employed for the purpose of analysis, therefore, it is absolutely essential to examine the stationary of the said data, for the reason that, without checking

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the stationary, the result may be misleading and unauthentic. Unit root tests are employed to test the stationary of the time series data. ADF test by Dickey and Fuller is used to assure the stationarity of the time series data in this study. A further choice of empirical test depends upon the stationarity of the data.

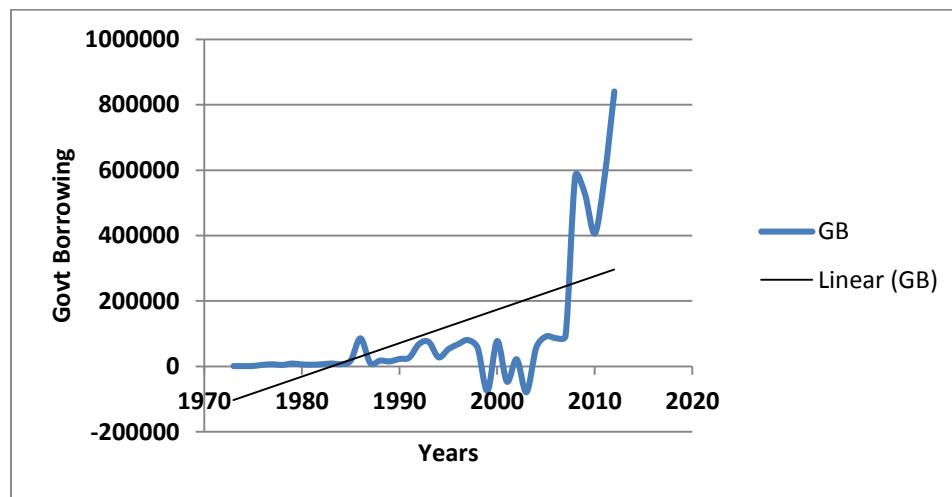
### 4. Empirical Findings

First, we have to explore the association between our dependent and independent variables that GDP deflator, money supply and government borrowings one by one in the diagrams.



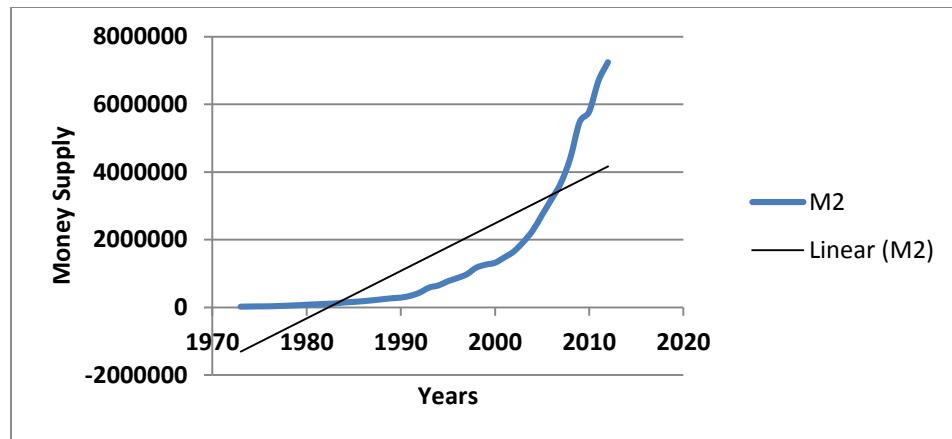
**Figure 2: Inflation Trends in Pakistan**

As the figure 2 show that inflation has an exponential growth in Pakistan and especially after 1990, the rate of change of all indicators of inflation, CPI, WPI and GDP Deflator are increasing rapidly.



**Figure 3: Government Borrowing Trend in Pakistan**

The above graph shows the trend of government borrowing in Pakistan from the time span 1973 to 2014. There are large fluctuations in the government borrowing data of Pakistan. But after 2005 government borrowing increases rapidly.



**Figure 4: Money Supply Trend in Pakistan**

The figure 4 shows the trend of supply of money in Pakistan from the time span 1973 to 2014. The data of money supply grow exponentially after 1990 and it's still increasing, but after 2005 it increases very sharply.

Now moving towards the empirical results of this study:

**Table 1: The ARDL Co-integration Analysis**

<b>Estimated Model</b>	$\text{Loggdpdeft} = \text{F}(\text{Loggdpdef}, \text{Logexchrate}, \text{Logdebdom}, \text{Logdebfore}, \text{Logdebfore}, \text{Logm2})$	
<b>Optimal lag structure</b>	$(1,0,0,1,0)$	
<b>F-statistics</b>	5.7675*	
<b>Significant level Critical values (T = 41)</b>	Lower bounds, I(0)	Upper bounds, I(1)
<b>5 per cent</b>	3.9343	5.2128
<b>10 per cent</b>	3.3148	4.4312
<b>R2</b>	0.99895	
<b>Adjusted R2</b>	0.99873	
<b>F-statistics</b>	4497.6*	
<b>Durbin Watson Test</b>	1.6810	
<b>Diagnostic tests</b>	F-statistics (P value)	
<b>Serial Correlation</b>	1.3959	
<b>Functional From</b>	0.83339	
<b>Normality</b>	2.6320	
<b>Heteroscedasticity</b>	3.2352	

The above table shows that there is a significant association between dependent and independent variables. All the diagnostic tests confirmed that there is no correlation, no functional form error, no Heteroscedasticity and no normality effect in the model.

**Table 2: ARDL Estimates**

Dependent Variable = LOGGDPDEFt				
Variable	Coefficient	Std. Error	T-Statistic	P Value
<b>LOGGDPDEF(-1)</b>	0.62425	0.096022	6.5011	0.000
<b>LOGEXCHRATE</b>	-0.15032	0.088392	-1.7006	0.098
<b>LOGDEBDOM</b>	-0.00698	0.042612	-0.16383	0.871
<b>LOGDEBFORE</b>	0.013097	0.053238	0.24601	0.807
<b>LOGDEBFORE(-1)</b>	-0.071792	0.038203	-1.8792	0.069
<b>LOGM2</b>	0.31759	0.085467	3.7160	.001
<b>Constant</b>	-1.9541	0.75411	-2.5912	.014
<b>In Trend</b>	-0.019369	0.012765	-1.5173	0.139
<b>R-squared</b>	0.99895	Durbin-Watson		1.6810
<b>Adj. R-squared</b>	0.99873	F-statistic		4497.6 [0.000]
Diagnostic Tests				
F-statistic	F-Value	Prob.		
<b>Serial Correlation</b>	1.3959	(0.246)		
<b>Functional From</b>	0.83339	(0.368)		
<b>Normality</b>	2.6320	(0.268)		
<b>Heteroscedasticity</b>	3.2352	(0.081)		

**Table 3: Long Run Results**

Dependent Variable = LOGGDPDEFt				
Variable	Coefficient	Std. Error	T-Statistic	P value
<b>LOGEXCHRATE</b>	-0.40005	0.21274	-1.8805	0.069
<b>LOGDEBDOM</b>	0.018579	0.11097	0.16742	0.868
<b>LOGDEBFORE</b>	0.15621	0.13739	1.1370	0.264
<b>LOGM2</b>	0.84523	0.26188	3.2275	.003
<b>Constant</b>	-5.2005	2.2001	-2.3637	.024
<b>In Trend</b>	-0.051547	0.038383	-1.3430	0.188

The variables Money Supply and Exchange Rate are statistically significant and the variables Foreign Debt and Domestic Debt are statistically insignificant to explain Inflation in the long and in the short run as well for the period 1973 to 2014. This outcome differs from Serfraz & Anwar (2009) and Agha and Khan (2006) because they employ Johansen Cointegration Test and VAR or Vector Autoregressive Model. As said earlier, the ARDL bound testing approach is applied in this study.

**Table 4: Error Correction Model**

<b>ECM=LOG GDPDEF-0.40005*LOG EXCHRATE+0.018579*LOG DEBDOM+0.15621*LOG DEBFORE-0.84523*LOG M2+5.2005*CONS+0.051547*TREND</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>T-Statistic</b>	<b>Prob.</b>
<b>ΔLogexrate</b>	-0.15032	0.088392	-1.7006	0.098
<b>ΔLogdebdom</b>	-0.0069811	0.042612	-0.16383	0.871
<b>ΔLogdebfore</b>	0.013097	0.053238	0.24601	0.807
<b>ΔLogm2</b>	0.31759	0.085467	3.7160	0.001
<b>ΔTrend</b>	-0.019369	0.012765	-1.5173	0.138
<b>ECTt-1</b>	-0.37575	0.096022	-3.9131	0.000
<b>R-squared</b>	0.58805	<b>Adj. R-squared</b>		0.50067
<b>Durbin-Watson</b>	1.6244	<b>F-statistic</b>	7.8513	0.000

Table 4 represents a short run connection between the inflation and other independent variables. To be the significance of Error Correction Model in the short run there must be two standards must be met that Error Correction Term value ought to be negative and statistically significant. The short-term analysis or Error Correction Model depicts that the Error Correction Term value or the speed of adjustment from the short to the long run path is negative and statistically significant.

##### **5. Conclusion and Policy Recommendations**

In case of Pakistan supply of money and the exchange rate have statistically significant effect on inflation. Both from the ARDL bound testing approach and Error Correction Model, inflation is influenced through by the supply of money and the exchange rate. As money supply increases and the exchange rate decreases, inflation increases.

Consequently, keeping these outcomes in mind it is proposed that the government of Pakistan has to take care of its borrowing. It is also found in the current situation of the economy that if there is an increase in the money supply in financing the deficit, it will create inflationary pressure on the economy.

The findings of the study suggest that the public sector could enhance the fiscal deficit slightly. Nevertheless, with the objective of keeping the rate of inflation at its minimum, the government must be expended in this way that it as well enhances the growth rate of the economy. This enhancement in the GDP may counterbalance completely or partially, the pressure on the rate of inflation from the fiscal deficit. Higher output will reduce the rate of inflation importantly.

External borrowing must be treated as the last option to finance deficit because nowadays conditions that are applied by different institutions and countries not only created inflation, but they also leads to the extra debt burden which growing exponentially with very high rate of interest.

This article determines that the entire variables specifically supply of money and the exchange rate has a significantly important effect on the rate of inflation in Pakistan. And it is established that the budget deficit financing through the supply of money associated with or tending to cause increases in inflation in Pakistan.

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