IMPACT OF BUDGET DEFICIT, MONEY SUPPLY AND GDP GROWTH ON INFLATION IN PAKISTAN: AN ECONOMETRIC ANALYSIS

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ABSTRACT

All nations, especially developing nations, have prioritized economic growth for decades. Some governments are focusing their monetary strategy on price stability. Home inflation shows the market's pricing stability. The current study investigates why Pakistan cannot close the deficit gap despite various measures. We'll also investigate whether Pakistan's budget deficit and money supply increase inflation. Quantitative and time series secondary data from 1980-2022 of Pakistan have been used. Budget deficit (BD), money supply (MS), and GDP growth are independent variables while inflation is dependent. Two-stage least square (TSLS) testing showed that MS directly affects inflation in Pakistan. It has been found that the growth rate of Pakistan's BD will lead to an increase in inflation; there is a correlation between the two that is both positive and statistically significant. Price stability depends on national monetary and fiscal policies. Thus, monetary expansion and inflation are often related. Money growth causes inflation, while monetary policy adjustments reflect economic trends. In addition, the OLS test that was used in this research came to the conclusion that BD had a direct and favorable impact on inflation. Moreover, GDP has an inverse relationship with inflation, and it is predicted that as Pakistan's GDP growth rate increases, the country's inflation rate will fall. It is recommended that Pakistan's government must prioritize productive public investment to boost economic growth and reduce inflationary pressure, tax reforms are also needed to reduce deficit financing. Pakistan should also look for ways to control its excess spending to avoid budget deficits. In the end, the government must encourage entrepreneurship and innovation to develop a business-friendly environment.

Keywords: *Inflation; Budget Deficit; Money Supply; GDP Growth; Pakistan.*

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INTRODUCTION

Over the course of the past many decades, the expansion of a nation's economy has been the primary concern of all nations, particularly developing nations. Some nations have begun to shift their approach to monetary policy in the direction of focusing on a single objective, specifically price stability. The rate of inflation that is experienced on the home front provides evidence of the market's ability to maintain price stability (Bina et al., 2023). During the 1960s, one of the most important goals of development strategy was to promote economic growth. The developing countries, including Pakistan, have committed themselves to persistently pursuing economic progress. Putting aside the country's very long history, Pakistan's economic development may be broken down into numerous distinct stages. At the beginning of the 21st century, there was a significant shift in the economic condition in Pakistan. The rise in oil prices, the energy crisis, the deteriorating security situation, and the overall conditions of the global economy, particularly in the years following the global financial crisis in 2007 (Priya et al., 2021), have made it necessary to do in-depth research on the macroeconomics of both developed and developing nations.

Pakistan is still confronted with challenges on both the domestic and international fronts, one of the biggest challenges among them being the war against extremism, the energy crisis, and the unpredictability of Pakistan's foreign inflows. When a country is in debt, the only way to get out of it is to borrow money from other countries. The budget deficit is the simplest tool that analysts have at their disposal to evaluate the state of the nation's finances (Khieu, 2021). The fiscal imbalance is a significant obstacle that many developing countries must overcome. The deficit creates an unfavorable environment for the government to function in. The unjustified expansion of the money supply is limited, and the exchange rate is stabilized, in order to prevent inflation (Azra, 2020). Because of their limited capacity to raise revenue and mobilize domestic resources, in 1960, Pakistan's BD % of GDP was 2.1, in 1970 was 5.3%, and in 1980 was 7.1%. The deficit was supposed to be reduced and maintained at 4% of GDP in 1990 but instead, it stayed at 6.9% of GDP, only marginally better than the deficit of the 1980s. The average annual BD was 4% from 2001 to 2010. From 2010 to 2013 it averaged 7.4% of GDP, but in 2014 it fell to 5.5%. Targeted development spending on the low end and non-tax revenues on the high end led to this improvement. The government gap shrank more in 2015-2016, representing a smaller share of GDP. Managing current expenditures and raising tax collections helped bring the fiscal deficit down to 4.6% of GDP in 2015-2016 from 5.3% in 2014-2015 (Hassan et al., 2020). Problems in the economy are caused when a nation's budget deficit grows larger. Printing new currency notes to fill the void is one approach that might be

taken to accomplish this goal. According to the accepted economic theory, we are aware that an expanding money supply in the economy would eventually result in an increase in prices.

There have been several studies conducted on the subject of how budget deficits affect inflation. In order to cover such a huge subject as a budget deficit and inflation, numerous researchers have utilized a variety of approaches. However, the purpose of this study is to investigate the fundamental problem of why Pakistan is unable to close the fiscal deficit gap even though several initiatives have been taken to close the gap. In addition to this, we will look into the question of whether or not an increase in the budget deficit and money supply causes inflation in Pakistan.

RESEARCH OBJECTIVES

- To examine the relationship between BD, GDP, and inflation in Pakistan.
- To investigate the impact of MS on inflation in Pakistan.

LITERATURE REVIEW

Relevant literature has been explored to further study the depth of the phenomena. Narayan et al., (2019) in his study established that the relationships between money supply, inflation, budget deficits, output, and import prices are crucial for Fiji. While inflation is the dependent variable, it was discovered that inflation, deficits, and money supply have significant co-integration. The long-run elasticities confirmed that MS and BD cause inflation. There is another finding of the study which suggests a short-run unidirectional causality between MS and inflation and a causal relationship between MS and BD that causes both money supply and deficits to 'Granger-cause' inflation in the long run (Lopez & Weber, 2017). Similarly, Azra et al. (2020) analyzed the factors influencing the inflation and economic growth of Pakistan. In order to combat inflation, the development of the money supply is restricted, and the exchange rate is stabilized. However, it is less likely that imports will be reduced to reduce inflation. Due to the prevalence of corruption and money laundering, it seems unlikely that the Government of Pakistan (GoP) will be able to curtail the Budget Deficit. The development of human resources, coupled with investment and value addition by both agriculture and industry, significantly contributed to economic growth. The models of inflation and economic growth were found to be appropriate and sound after being put through a series of diagnostic and specificity tests.

As a result of the pandemic (COVID-19), many countries experienced economic difficulties. A study conducted in Indonesia seeks to determine the role of Bank Indonesia's monetary policy in combating the Covid-19 pandemic. The method utilized in this study is descriptive

qualitative research, with a substantial amount of data taken from the literature and reports published by Bank Indonesia and collected through library research. The study concludes that Bank Indonesia is taking economic issues during the Covid-19 pandemic seriously (Manullang et al., 2023). Kalumba et al. (2023) concluded that the effect of money supply is negligible in both the short run and the long run at a significance level of 5%, it cannot be utilized as a useful benchmark for monetary policy to influence inflation in Zambia.

In spite of the fact that economists subscribe to a variety of differing views on inflation, they are of the same opinion regarding its root cause. Because inflation is a monetary phenomenon, budget deficits can only produce inflation if they are reflected in monetary aggregates (Chaudhry et al., 2015). Inflation will be caused when a budget deficit is financed by the central bank because this will lead to an increase in liquidity. The reviewed empirical evidence demonstrates that the inflationary impact of budget deficits varies depending on the techniques used to fund the deficits. During the course of this research, the time-series data was utilized to evaluate the connection between Turkey's budget deficit and the country's overall rate of inflation (Koyuncu, 2014). Hamza et al., (2019) established that economic expansion is characterized by rising inflation and widening budget deficits. The primary variable is the increase in the money supply, while the independent variables are the growth in GDP, the number of unemployed people, the official exchange rate, and the deficit in government spending. The data was obtained from the "World Development Indicator" and "Pakistan Economic Survey." The results indicate that budgetary shortfall, GDP growth, and money supply have substantial positive effects, while unemployment and the official exchange rate have significant negative effects. The study suggests that rather than focusing on foreign financing, leaders should concentrate on generating new revenue sources.

Maintaining price stability is considered an important factor in determining the growth rate of output because one of the major goals of the majority of macroeconomic policies is to achieve sustainable growth of GDP while simultaneously trying to reduce inflation as well. The effect of broad money supply and fiscal deficit on inflation in the context of Asian nations resulted in a significant impact on inflation when using the PMG technique of model estimation. On the other hand, it was also established that government expenditure, fiscal deficit, and interest rate are the predictors of inflation as well (Nguyen, 2015). Garba (2023) analyzed the minimum level of budget deficit and money supply that would be required to make inflation stable in Nigeria. It is observed that Nigeria's budget deficit increases the money supply which in turn causes inflationary pressure. To reduce budget deficit, the study advocates the idea of reducing the cost of governance by decreasing administrative expenses and compensation of political

office holders. In order to mitigate deficit-induced inflation, there is only one way which is to ensure that the annual budget deficit does not exceed the threshold value. However, the government needs to strengthen public financial management reforms and it will foster fiscal discipline and eventually be able to reduce the fiscal deficit. Attia et al., (2023) determined a causal connection between Egypt's budget deficit and the country's rate of inflation from the years 1991 to 2021. According to the findings, there is a two-way connection between the budget deficit and inflation. As a result, the researchers suggest that the government needs to justify its expenditure by removing the corruption that is associated with it. Reducing the budget deficit through raising direct and indirect taxes. Long-term pound stabilization by increasing production and exports. Eliminating public finance corruption to rationalize government spending. Combating tax evasion improves the tax system's financial resource mobilization.

Researchers have found conflicting opinions on the factors that have an effect on inflation. Economists are in agreement, however, that prolonged inflation is caused by an increase in the money supply that occurs at a greater rate than the growth of the economy. Bina et al. (2023) analyzed the factors that contribute to inflation in Indonesia. According to the findings, the money supply, gross domestic product, as well as imports and exports, did not have a significant impact on the short-term rate of inflation in Indonesia. However, the results revealed that the exchange rate did have a substantial impact on the rate of inflation. The money supply, the exchange rate, and exports all have a major impact on inflation in Indonesia over the long term, however, gross domestic product and imports have a negligible impact on inflation in Indonesia.

RESEARCH HYPOTHESIS

Hypothesis 1: Budget deficit has a significant causal relationship with inflation.

Hypothesis 2: Money supply has a significant causal relationship with inflation.

Hypothesis 3: GDP has a significant causal relationship with inflation.

METHODS

A methodology of research gives the study legitimacy and guarantees that its conclusions are supported by reliable scientific evidence (Daniel, 2011). It also includes a thorough plan that organizes the entire procedure and keeps researchers on track while streamlining and improving their work. The reader can better understand the approach and methods utilized to get the results thanks to the researcher's methodology (Pandey & Pandey, 2021).

This study has used quantitative and secondary data, this study used time series data from 1980-2022 in Pakistan. Inflation is taken as the dependent variable and budget deficit (BD), money supply (MS), and GDP growth as independent variables. The study has used data in terms of percentage i.e., inflation as CPI (consumer price index annual %), MS as (Broad money growth annual %), BD as (fiscal deficit), and GDP as (Gross domestic product annual %). Data on CPI, MS, and GDP has been collected from the World Bank's official website "World Development Indicator". Data of BD has been taken from the website of the central bank of Pakistan i.e., State Bank of Pakistan. The study also employed a "unit root test" (ADF & PP) for observing the stationarity of data, and it examined descriptive statistics; a two-stage least square was used to analyze regression among variables. The "Granger causality test" has been used for observing a causal association among selected variables, and the "LM test" and "heteroscedasticity" Tests have been applied to determine whether the data exhibited multicollinearity and heteroscedasticity, respectively. Further, a correlation matrix has been formed and the Ramsey reset test applied.

Model of the Study

In the current study, we have examined the impact of BD, MS, and GDP on inflation. To conclude more standard specification of the model, data has been utilized in its percentage form and the specification was adapted from the reviewed literature.

Inflation = α + b1 (BD) + b2 (MS) + b3 (GDP) + é

Where,

BD = Budget Deficit

MS = Money Supply

GDP = Gross Domestic Product

So, the equation formed above is the standard specification of the model that is being studied to understand the phenomena of inflation in Pakistan keeping BD, MS, and GDP as significant contributors, ceteris paribus.

RESULTS AND ANALYSIS

Descriptive Statistics

Descriptive Statistics provides a thorough explanation of how to calculate coefficients. Similar to inferential statistics, descriptive statistics cannot be founded on probity (Kaur et al., 2018). As opposed to inferential or inductive statistics, the goal of descriptive statistics is to provide a short summary of a sample rather than to draw inferences about the "population" that the "sample" is meant to represent. This generally suggests that descriptive statistics are frequently

nonparametric statistics that are not dependent on probability theory, in contrast to inferential statistics (Conner & Johnson, 2017).

Table 1. Descriptive Statistics

	Inflation	**MS**	**BD**	**GDP**
Mean	8.466501	14.88826	3.704651	4.694893
Median	7.921084	14.56582	3.600000	4.832817
Maximum	20.28612	42.90887	1.900000	10.21570
Minimum	2.529328	4.314225	8.700000	-1.274087
Std. Dev.	4.086538	6.656575	3.373563	2.216825
Skewness	0.844079	1.728432	0.124429	-0.137559
Kurtosis	3.935431	8.785376	1.637324	3.248968
Jarque-Bera	6.673800	81.37837	3.437876	0.246667
Probability	0.035547	0.000000	0.079256	0.883969
Sum	364.0595	640.1953	159.3000	201.8804
Sum Sq. Dev.	701.3913	1861.019	477.9991	206.4011

The mean value of Inflation (Inf) is 8.466501, MS mean value is 14.88826, BD's mean value is 3.704651 and GDP's mean value is 4.69893. The median values of Inf & MS are 7.921084 & 14.56582, and BD and GDP's median values are 3.60000 and 4.832817. The standard deviation value of Inf is 4.086538, the standard deviation (SD) of MS is 6.656575, BD's value of SD is 3.373563, and GDP's SD value is 2.216825. JB-test is used to check the normality of data. Inf's Jarque Bera value is 6.673800 with a p-value of 0.035547, MS's Jarque Bera value is 81.37837 with a p-value is 0.0000, BD's Jarque Bera value is 3.437876 with p-value is 0.07 while Jarque Bera value of GDP is 0.246667 with p-value 0.88396 (Anderson, 2011).

ADF (Augmented Dickey Fuller)

Each variable's stationarity is evaluated using the ADF test, which is also used to rank each variable's integrations. An additional lagged term of the dependent variable is included in the ADF test.

Philips & Perron (PP)Test

This test is a reduced and streamlined description of the basic ADF test. The theory and relapse circumstances of the "PP test" are quite similar to those of the "ADF test". As ADF test statistics do concerning continuous measurements (t-value), PP test statistics do the same with respect to structured attributes.

Table 2. ADF & PP

Variables	ADF				PP			
	Level		1st diff		level		1st diff	
	P-value	T-value	P-value	T-value	P-value	T-value	P-value	T-value
Inf	-	-	0.0000	6.737473	-	-	0.0000	6.734752
MS	0.0002	4.999256	-	-	0.0002	4.944439	-	-
BD	-	-	0.0000	6.997403	-	-	0.0000	7.015770
GDP	0.0003	4.780024	-	-	0.0004	4.743373	-	-

The ADF test indicates that inflation is stationary at the first difference (t=6.737473, p-value= 0.0000), and the PP test yields the same result (t=6.734752, p-value= 0.0000). MS is holding steady at a level, the t-value for the ADF test was 4.999256 (p=0.0002), and the t-value for the PP test was 4.944439 (p=0.0002). Both the ADF and PP tests find that BD is stationary at the first difference, with t-values of 6.997403 and 0.0000, respectively. The GDP is stable at its current level; the ADF t-value for GDP is 4.780024, and the PP t-value is 4.743373, both with probabilities of 0.0003.

Granger Causality Test

Granger causality test evaluates the claims that a linear relationship is unidirectional, that one variable is dependent and the other independent, or that there is no functional connection between the two variables. A statistical hypothesis test that looks at the potential to use one time series to predict another time series is known as the Granger causality test.

Table 3. Granger Causality Test

Null hypotheses	F-statistic	P-value
MS doesn't cause Inflation	4.35416	0.0203
BD doesn't cause Inflation	0.62032	0.5434
GDP doesn't cause Inflation	1.84838	0.1721

Based on the above results and probability statistics value, we failed to reject only the first null hypothesis and failed to accept all remaining null hypotheses since the probability value of the null hypothesis is greater than 0.05 for both BD and GDP.

LM Test for Serial Correlation

The LM test is utilized on the dataset in order to ascertain whether or not the time series data is influenced by "serial correlation". Since the "p-value is greater than 0.05", it indicates that there exists no issue of autocorrelation in the data.

Breusch-Godfrey Serial Test

Table 4. Breusch Godfrey Serial Test

F-Statistic	1.678123	P-value	0.1263

The f-statistic is 1.678123 and the probability value is 0.1263, the value of probability is more than 0.05(5% level of significance) which indicates that we have strong evidence that there is no issue of autocorrelation in the data.

Heteroscedasticity Test

The test of Breusch-Pagan, Godfrey is utilized to evaluate if data has any issue of heteroscedasticity in a linear regression model or not. The test can determine whether or not the model is significant. Verifying that the assumptions of the linear regression model are met is a crucial step that must be taken into account before drawing any conclusions on the variables' respective relationships with one another.

Table 5. Heteroscedasticity Test

F-Statistic	1.050065	p-value	0.3813

We fail to reject the null hypothesis because the probability value of 0.3813 is more than the level of significance and the F-value is 1.050065, so we can conclude that the data has no issue of heteroscedasticity.

Ramsey Reset Test

A common test that can be used to verify the linear regression model's specification is the Ramsey RESET. The F statistic value is 1.718952 and the p-value is 0.0938. The probability value is greater than 0.05 (5% level of significance) which indicates that the model is correctly Specified (Shukur et al., 2004).

Table 6. Ramsey Reset Test

F-statistic	1.718952	P-value	0.0938

Two Stage Least Square

The statistical approach to studying structural equations is known as 2SLS (two-stage least squares) regression. This method expands upon the OLS approach. Having feedback loops built into the model is also helpful. Maximum likelihood is used to estimate the route coefficient in structural equation modeling (Bollen & Paxton, 2017)

Table 7. Two Stage Least Square Statistics

Variables	Coefficient	Standard error	t-statistics	p-values
BD	0.561635	0.228046	2.462809	0.0182
MS	0.325004	0.093529	3.474896	0.0012
GDP	0.122446	0.325355	0.376345	0.7086
R^2	0.478047	**Adjusted R^2**	0.551949	
J-statistic	16.04182	**P-value**	0.000062	
Durbin-Watson stats	0.957844			

The probability for BD is 0.0182, the T-value is 2.462809, and the coefficient value is 0.561635 with an std. error of 0.228046. As Pakistan's BD increases, so will inflation ceteris paribus (CP); the two are positively and statistically significantly related. Specifically, the t-value for the correlation between MS and Inflation is 3.474896 (at a significance level of 0.0012), and the std. The error of the coefficient is 0.093529. The standard error for the GDP coefficient is 0.325355 (t=0.376345, prob=0.7006, coefficient=0.122446). Since GDP has a probability greater than 0.05 of negatively influencing inf. The R-square value is 0.478047 which indicates that the 47% variation in the dependent variable is due to the independent variables. The whole model has a significance level of greater than 5%, with a J statistic value of 16.04182 and a p-value of 0.000062.

CONCLUSION AND POLICY IMPLICATIONS

One of the most important macroeconomic goals for developing countries like Pakistan is price stability. The monetary and fiscal policies of nations play a crucial influence in maintaining price stability. Deficits in the public sector have a bad reputation, in part because people think that soon the government will start printing money to cover the deficit, which will lead to inflation. Because of this, monetary expansion and inflation are frequently linked. If the indicators are not controlled, the positive flow of money supply results in high inflation. However, the low supply is even more detrimental since growth and expansion are also hampered by reduced demand for labor. Pakistan has experienced fluctuating inflationary pressures over the past sixty years. Although money growth is the direct cause of inflation, changes in monetary policy are indicative of developments in other economic sectors. In Pakistan, it is generally accepted that budget shortfalls may have been a major factor in explaining price fluctuations.

On the basis of the above analysis, it is stated that this study using annual data from 1980-2022 has investigated the impact of MS, GDP, and BD on inflation in Pakistan. With testing Two stage least square (TSLS) this study found that MS has a direct and significant impact on

inflation in Pakistan, the result of this study has been supported by Nassar (2005), Hamza et al., (2019), which also show a significant association in MS and Inflation. Furthermore, this study through the OLS test found that BD has a direct and positive impact on inflation, the result of this study has supported by (Cottarelli et.al, 1998) who found the relation between BD and inflation by using panel data of 47 countries with data from 1993-1996. (Hamza et al., 2019) found a positive impact of BD and MS on inflation in Pakistan. (Şahin, 2019) explained that budget deficit has a positive impact on inflation not only in the "short run" but also in the "long run". The study further found that GDP has a negative relation with inflation, as the GDP growth rate increases in Pakistan there will be a decline in inflation.

RECOMMENDATIONS

- Pakistan's Government must prioritize productive public investment so that can stimulate economic growth in the country by eliminating inflationary pressure.

- The government of Pakistan can introduce tax reforms so that may decline its dependency on deficit financing.

- For the sake of price stability and economic growth at once, the government of Pakistan may implement some crystal-clear monetary policy.

- The government of Pakistan needs to create a favorable business environment and must support entrepreneurship and innovation in the country.

- The government of Pakistan should control its extra expenditures to meet its expenses to its revenue and to avoid budgetary deficit.

- The government of Pakistan should introduce policies that stimulate economic growth and generate tax revenue.

- Whenever applying fiscal and monetary policy government and the State Bank of Pakistan must be careful about variables such as money supply, fiscal deficit, government expenditures, and interest rate, all these variables can contribute to inflationary pressure in the country.

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