

## ENIGMA OF INFLATION TARGETING POLICIES IN PAKISTAN

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### **Abstract**

*Inflation targeting has been an effective strategy during the past few decades to curb inflation, stimulate economic growth, and check unemployment. This study focuses on the long-term relationship between interest rates and inflation to evaluate inflation targeting as a monetary framework in Pakistan by using annual time series data for the years 1980 to 2020 to explore problems with inflation targeting. In this study, inflation is the dependent variable, whereas the interest rate, domestic debt, and indirect tax revenue and political stability are independent variables. To assess the long-run co-integration analysis, the Johansen co-integration approach has been employed for the data analysis of the developed model. It is concluded from the findings of the co-integration analysis that interest rates, domestic debt, and political stability have a significant and negative impact on inflation, whereas the impact of indirect tax revenue on inflation is positive and significant, supporting the formulated hypothesis. The results suggest that the government and decision-makers may develop strategies to manage and control interest rates, effectively regulate domestic debt, and reform the tax system in order to limit inflation in the country. The most important factor in ensuring the country's economic stability is the preservation of political stability.*

**Keywords:** Inflation Targeting, Consumer Price Index, Inflation, Interest Rates, Domestic Debts, Indirect Tax Revenues, Political stability, Pakistan.

### **INTRODUCTION**

The inflation targeting concept is a framework for monetary policy that includes a numerical target, public announcements for various time frames, and a clear claim that a low, stable inflation rate is the main goal. One of the other important aspects of inflation targeting is educating the public about the objectives and strategies of monetary policy (Awais, Yaqub, Iftikhar, Bhatti, & Thaker, 2020; Bernanke, 1999). With the inflation targeting strategy, the central bank makes an effort to keep inflation within a predetermined range while largely ignoring how monetary policy affects other areas of the economy. Inflation targeting was used in more than 19 countries as of 2001, and other countries were thinking about adopting it (Mishkin & Schmidt-Hebbel, 2001).

Due to the failure of numerous nominal anchors, including exchange rate targeting and monetary targeting, to help central banks achieve their objectives. Inflation targeting programs were first used by a growing number of advanced countries in the 1990s. In response to the success of IT in industrialized economies, some emerging countries, such as Poland, Brazil, the Czech Republic, and Chile, began establishing IT strategies (Werner, Schmidt-Hebbel, Haussmann, & Chang, 2002). The Czech Republic, Hungary, and Poland, the three transitional nations that implemented

Inflation targeting, sufficiently satisfied these and considered it practical and useful. Each of the three nations had a separate central bank with the specific goal of pursuing price stability. This independence and price stability mandate had occasionally been strengthened prior to the adoption of inflation targeting, making central banks' monetary policy decisions more accountable and transparent (Jonas & Mishkin, 2004). In 1989, New Zealand employed inflation targeting for the first time. Since then, it has become more common, with 30 countries currently using it. Many countries adopted it in the wake of issues with the exchange rate or inflation. Its monetary

policy remained substantially in line with inflation targeting. When another monetary system failed to produce the desired results, inflation targeting was typically used (Fabris, 2006).

The pre-announced inflation target is to be the goal of monetary policy and a benchmark for the operational independence of the central bank. The use of a range of economic variables in policy making and the general conviction that price stability might be the main aim of monetary policy on the part of society and the government are additional characteristics. Various other monetary theories shared some characteristics of inflation targeting; particularly, the inflation-targeting framework no longer stood alone in terms of transparency and communication, which were its defining characteristics (Kahn & Jager 2011). The central bank of a country can employ monetary policy to promote long-term economic growth by restricting the quantity of money available to banks, consumers, and businesses. It regulates the economy, the cost of money, and the band reserve needs by controlling inflation and deflation and setting interest rates. Corporate expansion, net exports, employment, debt expenses, and the relative cost of spending vs. saving are all affected. Everything has an effect on aggregate demand, whether directly or indirectly. In order to assist the government in achieving its inflation and real economic growth targets, it has an impact on a nation's overall demand. The creation and execution of monetary policy are under the control of Pakistan's central bank (SBP). One of Pakistan's most pressing problems since 1980 has been inflation (Aaqib et al., 2018). The State Bank of Pakistan works to accommodate monetary policy through its MPC [Monetary Policy Committee] in an effort to reduce inflation in the nation (SBP Annual Report FY21). Pakistan's State Bank has a history of using monetary aggregates to control inflation. However, in 2009, the State Bank of Pakistan altered its operating aim from monetary aggregates to interest rates (Jan. 2013).

Political stability is a significant factor in determining inflation since less stable governments are more likely to impose the inflation tax due to their propensity to pursue ineffective economic policies and to be less ready to carry out changes that might benefit future administrations. Both likelihoods might be increased by the existence of a sizable shadow economy. The findings of this analysis suggest that higher inflation and policy failures are likely to occur in an economy with more shadow activity while maintaining political stability. Regardless of the level of political stability, a sizable shadow economy encourages politicians and policymakers to employ the inflation tax as a source of revenue. As a result, political stability only helps to reduce inflation if the shadow economy is not too large (Mazhar & Jafri, 2017).

Imran, Murtiza, and Akbar (2023) state that a country's economy must prosper in order for society to unite, the rule of law to be respected, and its economy to grow. The nation-building and state-building processes directly benefit from the political system's stability. A government's inability to uphold stability is largely caused by a weak political system, ineffective political parties, and a dysfunctional political culture. As a direct result of the nation's current political unrest, Pakistan's economic and political issues have both gotten worse domestically and internationally (Zeeshan et al., 2022). Pakistan, a nation having access to nuclear weapons, rich terrain, clever inhabitants, and abundant natural resources, is an instance of acute political instability (Jiskani et al., 2020). Pakistan is experiencing serious problems, especially in the political and economic arenas. The entire globe is providing Pakistan with help and assistance, but in light of the country's tumultuous political environment, this vast infusion of foreign aid isn't having much of an impact. The findings show that a higher degree of the shadow economy is a factor in the rising inflation rate. However, the level of inflation decreases as political stability increases. Additionally, the size of the shadow economy has a significant influence on the relationship between political stability and the inflation rate (Tran, 2023).

## Objectives of the Study

- 1) To evaluate the performance of Pakistan's inflation targeting policies in the wake of criticism on monetarist approach.
- 2) To provide policy options based on the findings of this study.

## Significance of the Study

A country's central bank can use monetary policy to encourage long-term economic growth by limiting the interest rate and the amount of money that is available to banks, consumers, and enterprises. By limiting inflation and deflation and regulating interest rates, it manages the economy, the cost of money, and the demand for bank reserves.

The creation and execution of monetary policy are the responsibility of Pakistan's central bank (SBP). Inflation has been one of Pakistan's most pressing issues since 1980 (Aaqib et al., 2018). The State Bank of Pakistan makes an effort to manage inflation in the nation by adapting monetary policy through its MPC [Monetary Policy Committee] (SBP Annual Report FY21). The State Bank of Pakistan has a history of utilizing monetary aggregates to manage inflation. However, the State Bank of Pakistan changed its operational goal from monetary aggregates to interest rates in 2009 (Jan. 2013). Setting an inflation target and employing monetary policy tools to attain it is a crucial aspect of inflation targeting. Since 2016, the State Bank of Pakistan (SBP) has used inflation targeting as the foundation for its monetary policy. By December 2024, the SBP will have established a medium-term inflation target of 5 to 7 percent (MPC of the SBP, 2023).

According to macroeconomic theory, interest rates and inflation are inversely related. Inflation rises when interest rates are low; it declines when interest rates are high (Awais, Ellahi, & Sher, 2019; Rodgers, 2022). Mahmood et al. (2013) claimed that it is possible to analyze the long-term effects of Pakistan's inflation and interest rate tradeoff. In order to ascertain the long-term relationship between interest rates and inflation, this study is being conducted. The study's conclusions are restricted to the economy of Pakistan. According to research (Sohail et al., 2022), political unrest is linked to higher inflation rates over the course of the full term. The Pakistani people are in a challenging situation, and they are the ones who are actually suffering as a result of the country's weak economy, natural disasters, and political upheaval. The stability of the state's political system and the resolution of any issues that can result from the system's failure are essential for societal and economic well-being.

## REVIEW OF RELATED LITERATURE

The concept of inflation targeting had gained popularity among academics and decision-makers in the form of a sound monetary policy basis. Two strands in the literature could be used to summarize the advantages of inflation targeting for output and inflation. First, inflation and production performed better when inflation was targeted. In other words, a framework for inflation targeting might reduce the rate and variability of inflation, boost output growth while lowering the variability of that growth, and lessen the persistence of inflation, according to Neumann and von Hagen's 2002 comparison of statistics for inflation targets and non-targets over various time periods. Second, by reducing predicted inflation levels or making inflation more predictable, inflation targeting enhances inflation forecasting (Corbo, Landerretche, & Schmidt-Hebbel, 2001; Hu, 2003; Mishkin & Schmidt-Hebbel, 2001; Johnson, 2002).

The findings that countries that used inflation targeting had attained relatively low rates of inflation were shared by many scholars, including Bernanke (1999), Jonsson (1999), Svensson (2000), Friedman (2003), and others. The bulk of them, however, also came to the conclusion that the inflationary performance of these nations was equivalent to that of industrialized nations that had opted for different monetary regimes. According to a recent IMF analysis from 2005, inflation rates in emerging nations that utilize inflation targeting are significantly lower than they are in developing nations that use another monetary system. Additionally, the economic growth in those nations was unaffected by inflation targeting. Undoubtedly, more countries were adopting an inflation targeting system, and it was logical to assume that this trend would continue in the future. Inflation, inflationary expectations, the difference between nominal and real interest rates, and macroeconomic indices all decreased in nations that adopted inflation targeting policies, according to econometric studies. The same outcomes, according to opponents of inflation targeting, had been achieved in the US in the absence of an inflation targeting strategy (Fabris, 2006; Ullah, Zeb, Shah, & Awais, 2020). The public might think that a central bank puts price stability above all other economic objectives, which is why this idea is challenged. This conclusion was accurate because it was the central bank's responsibility to manage inflation within the predetermined range. There were irregular deviations from this objective because every economy was susceptible to different shocks and occasionally made blunders when formulating economic strategy. Despite the fact that these steps frequently harmed economic

growth, central banks often took corrective action to bring the inflation rate back within the intended range (Awais, Khan, & Muhammad, 2023; Fabris, 2006).

In FTPL theory, domestic debt is an important ingredient in inflation. We observed that, in developed and emerging countries, the problem is not the domestic debt but the cost of domestic debt in the determination of the inflation rate. Domestic debt with low interest rates is an important factor in the determination of price level through the Intertemporal budget valuation. On the other hand, high interest rates have a strong impact on high or hyperinflationary periods in emerging countries (Bildirici & Ersin, 2007).

Mahmood et al. (2013) claimed that the function of interest rate in the cointegration equation was inflation. Significant differences from zero existed between both of the equation's variables. In Pakistan, there was a direct correlation between the interest rate and inflation. In the cointegration equation, the interest rate's coefficient was 0.10. According to this statement, a one-unit change in the interest rate would result in an equal but opposite change in the inflation rate's value. Inflation would be reduced by 0.10 units for every unit that interest rates were raised. Similar to this, a one-unit drop in interest would result in a 0.10-unit rise in inflation. Karim and Karim (2014) stated that the primary issue with implementing monetary policy was whether the operating aim for the central bank should be interest rates or the monetary aggregate. Since November 1995, Malaysia's Central Bank, Bank Negara Malaysia (BNM), has switched its monetary policy strategy from monetary targeting to interest rate targeting. The goal of interest rate targeting was to provide sustainable long-run economic growth that was accompanied by price and financial stability. To do this, short-term interest rates were used as an instrument of monetary policy. In Pakistan, Ayub et al. (2014) looked into the Fisher hypothesis. It explained the connection between the nominal interest rate and the inflation rate. The study examined time series data spanning the years 1973–2010. The validity of the data's stationarity and non-stationarity was assessed using the ADF and PP unit root tests. The study examined the long-term link between the nominal interest rate and inflation using the Johansen and Engle-Granger co-integration methods. Over the research period, it was demonstrated that Pakistan's nominal rate of interest and inflation had an equilibrium long-run connection.

Wheeler (1999) uses variance decompositions and impulse response functions to examine the macroeconomic effects of government debt in the US throughout the 1980s and 1990s. The author investigates the effects of government debt on output, price level, and interest rates in order to test the Ricardian Equivalence theory. The study's findings demonstrate that high levels of public debt negatively and significantly affect interest rates, the level of prices, and economic production. (Ahmad, Sheikh, & Tariq, 2012).

According to Mbaye and Badia (2019), the global financial crisis of 2008 demonstrated that debt unquestionably had a detrimental impact on the economy, and failing to properly assess its magnitude and evolution might damage the ability of monetary policy to attain inflation stability. Over the past few decades, there has been a considerable change in both governmental and private debt, which reached an all-time high of \$184 trillion in nominal terms in 2017 and 225% of GDP. In the literature, there are various points of view on how public debt and inflation are related. The inflation theory that is most widely accepted holds that it is primarily within the control of monetary authorities since it is a monetary phenomenon. An expansionary monetary policy will raise the general price level and real output in the medium term, but only the price level will rise over the long run. The premise of the monetarist theory of price level determination is that the monetary authority has complete control over prices. In a Ricardian framework, this is shown by an active monetary policy and a passive fiscal policy.

The taxes on production and imports known as indirect taxes include VAT, excise taxes, import-related charges, other taxes on goods, and other taxes on production. The majority of EU nations agreed to raise the VAT and excise taxes as well as enact new consumption taxes during the crisis in order to raise more tax revenue. Inflation is a result of the way indirect taxes influence pricing (Modzierz, 2017).

The hypotheses that political stability lowers inflation and that it does so to a lesser extent in the presence of a sizable shadow economy are supported by the empirical data. The estimates hold up well to a range of estimation techniques as well as to different assessments of the institutional and macroeconomic indicators linked to inflation (Awais, Rehman, Raza, & Saleem, 2018; Mazhar & Jafri, 2017).

According to Tran (2023), Political instability has been included as a variable in some research to examine the causes of fiscal deficits. According to Roubini and Sachs (1989), political issues are connected with larger deficits. According to Cukierman et al. (1992a), more unstable or polarized political systems are more likely to experience situations in which an ineffective tax system intentionally limits the ability of the government to collect money from the public. Political instability and higher inflation have been linked, according to Campillo & Miron (1997). Due to tax evasion or expensive tax collection, the revenue of the government is spent more frequently in politically unstable societies than it is in stable and homogenous ones (Cukierman et al., 1992b).

According to Imran, Murtiza, and Akbar (2023), to secure economic growth, a fundamental understanding of political stability is required. Numerous studies have been conducted on the connection between political stability, inflation, and economic growth. Political unrest is largely a result of price hikes. The nation is reluctant to make any fresh investments for the foreseeable future due to the high rate of inflation. Using a cautious investment strategy contributes to the rise of political discontent. Numerous factors, including inflation, can affect politics. By deterring investment and igniting political unrest, political instability has an impact on the economy. As a result, the economy becomes more erratic, prices rise, and levels of investment decline.

## DATA OVERVIEW AND RESEARCH METHODOLOGY

### Data and Variables Overview

Annual secondary time series data were utilized in this study, encompassing the time frame of 1980 to 2020, to explore the long-run effectiveness of strategies that target inflation in Pakistan. The data sample has 41 observations. Since larger sample sizes have smaller error margins and lower standard deviations, they produce stronger and more trustworthy conclusions. The standard deviation (SD) measures how widely dispersed the data values are from the mean. The margin of error gets narrower the larger the study sample size. Researchers can reduce the risk of reporting false-negative or false-positive results by using larger sample sizes. The accuracy of the results will increase as the number of samples increases. In accordance with the appropriate Schwarz Bayesian Criteria (SBC), the data of the model chosen are stationary, normally distributed, and have no multicollinearity. We have discovered that our model is the best linear regression model and can be used to effectively predict inflation in Pakistan based on the aforementioned data set. The data of the variables are collected from the data sources of State Bank of Pakistan, World Development Indicators (WDI), 2021 and 2022 and World Governance Indicators (WGI), 2022 of World Bank.

The explanatory variables of this study are Interest rate, domestic debt, indirect tax revenue, and political stability, while the consumer price index (CPI) is a dependent variable used for inflation in Pakistan. Samimi and Motameni (2009); Saleem (2010); Mahmood (2013); Khushnood (2014); Quinonez (2015); Mazhar and Jafri (2017) all examined the effects of many variables on inflation and inflation targeting and came to meaningful conclusions.

The Consumer Price Index, which measures the total change in the price level over time, is derived using a representative basket of products and services. The consumer price index is a broad index that is used to calculate price changes for a selection of goods and services that represent consumer expenditure in an economy. The CPI is the most frequently quoted measure of inflation, closely followed by other measures used by policymakers, the financial industry, businesses, and consumers. In this study Consumer Price Index (2010=100) is used. Data of the said variable were taken from World Development Indicators, 2022.

A borrower pays interest to a lender as a proportion of the principal amount of the loan. The central banks' primary weapon for carrying out monetary policy is the key rates. Interest rates are being raised to reduce inflation and safeguard the currency. The State Bank of Pakistan reports' quarterly interest rate data were transformed into annual data for this study.

Domestic debt is the net domestic credit. It is the sum of net claims on the central government and claims on other sectors of the domestic economy. Data of the said variable were taken from World Development Indicators, 2021 and 2022. Data are in current local currency.

Indirect tax revenue is the money that the government receives from taxation on commodities. The majority of the government's funding comes from indirect taxes in Pakistan. Taxes less subsidies on products (net indirect taxes) will be used as a data variable in this study. Data of the said variable were taken from World Development Indicators, 2021 and 2022. Data are in current local currency.

Political stability is a qualitative terminology. Different approaches to political stability are seen to be (i) governmental duration; (ii) the absence of violence; (iii) the existence of legitimate constitutional regime; (iv) a multifaceted societal attribute; and (v) the absence of structural change (Hurwitz, 1973). Data of political stability were taken from World Governance Indicators, 2022.

## The Empirical Models

The following model was estimated to examine the determinants of inflation:

Inflation = f (Interest Rate, Domestic Debt, Indirect Tax Revenue, Political Stability) ..... (1)

This function asserts the impact of changes in the interest rate, domestic debt, indirect tax revenue and political stability on inflation.

Functional form of equation (2) is as under:

$$CPI = \beta_0 + \beta_1 INTEREST\_RATE + \beta_2 DOMESTIC\_DEBT + \beta_3 IND\_TAX\_REV + \beta_4 POL\_STABILITY + ei \dots \dots \dots (2)$$

CPI = consumer price index tends for inflation.

INTEREST\_RATE = Interest Rate

DOMESTIC\_DEBT = Domestic Debt tends for Net Domestic Credit

IND\_TAX\_REV = Indirect Tax Revenue

POL\_STABILITY = Political Stability

ei = standard error term

CPI is dependent while, INTEREST\_RATE, DOMESTIC\_DEBT, IND\_TAX\_REV and POL\_STABILITY are explanatory variables in the model.

Log-lin form of the regression is used to estimate the equation (2) and given as under:

$$LCPI = \beta_0 + \beta_1 INTEREST\_RATE + \beta_2 DOMESTIC\_DEBT + \beta_3 IND\_TAX\_REV + \beta_4 POL\_STABILITY + \epsilon_i \dots \dots \dots (3)$$

Where,

$\beta_0$  is intercept (constant). It may be either positive or negative, showing exogenous variable(s)'s effect on the model (the impact of all additional variables on the model that are not considered). While, the slope coefficients are  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\beta_4$  used for interest rate, domestic debt and tax revenue and political stability, respectively with the expected signs:  $\beta_1 < 0$ ,  $\beta_2 < 0$ ,  $\beta_3 > 0$ , and  $\beta_4 < 0$  displaying the dependent variable's percentage change when explanatory variable is changed by one unit. The standard error is  $\epsilon_i$  of regression.

## Estimation Methodology

In order to accomplish the aforementioned goals, this study looked into the factors that influence inflation in Pakistan. The following methodologies have been used in the study:

- I. In order to discuss the nature and normalcy of data, descriptive statistics are utilized by using the values of mean, median, mode, skewness, kurtosis, and Jarque bara.
- II. The study computed the correlation matrix for checking the existence of multicollinearity among the variables.
- III. In this study, the presence of a unit root in a time series was checked using the Augmented Dickey Fuller (ADF) unit root test.
- IV. To determine whether there was a long-term link between the variables, the study used the Johansen's cointegration test. If it has found that long run relation among variables exists i.e. variables are cointegrated to each other.

V. The Error Correction Model (ECM) has been estimated to determine short-term variations, historical disequilibrium levels, and adjustment speed.

### **Hypothesis of the Study**

The following Hypotheses were formulated with respect to the objectives of this study.

H<sub>1</sub>: Increase in interest rate, domestic debt and political stability shall result in decreasing inflation

H<sub>2</sub>: Increase in indirect tax revenue will lead to raise inflation

Because this study used annual time series data, time series techniques such as descriptive statistics, correlation analysis, determining whether the data are stationary, co-integration test, and error correction mechanism have been used. The results of this study were computed by using computer software EViews 10. These are covered in depth as follows.

## **RESULTS AND DISCUSSION**

This section covers the following sub headings:

### **Descriptive Analysis**

The descriptive statistics and Jarque-Bera statistics for each variable in the model have been generated in this part to verify the data's normality. Table 4.1 displays the mean values of the variables as well as their standard deviations. The analysis demonstrated the normal distribution of these variables by showing that the mean values of the LCPI (inflation), interest rate, indirect tax revenue, and political stability are greater than the values of their standard deviations. Domestic debt, however, has a non-normal distribution because its mean value is lower than the standard deviation value.

### **Jarque-Bera Statistics**

Additionally, data normality is examined using Jarque-Bera statistics. The probability values in Table 4.2 for the LCPI (inflation), interest rate, indirect tax receipts, and political stability are greater than 0.05, indicating that these variables are normally distributed. The probability values of Jarque-Bera statistics, which are smaller than 0.05, show that domestic debt has a non-normal distribution, though.

### **Correlation Analysis**

The correlation coefficients between the LCPI and the interest rate, domestic debt, indirect tax revenue, and political stability are listed in Table 4.3. As a result, none of the values for the regressors' correlation coefficients are greater than 0.9, indicating that the model variables are not multicollinear. The multicollinearity problem, according to Asteriou and Hall (2007), appears when the correlation between any two explanatory variables is greater than 0.9.

### **Unit Root Test**

An ADF (Augmented Dickey- Fuller) test is run for each variable to determine stationarity of each variable before assessing the co-integration connection. The results of this study at level and at first difference are given below.

### **ADF Result at Level**

The ADF test is used to check the stationary nature of the variables in the selected model. The ADF-statistics values are displayed along with their critical values at the 5% significance level in Table 4.4. Results from every ADF test are given at each level. This classification is expanded to include the following three categories: with intercept, with intercept and trend, and with none (neither with intercept nor with trend). All of the results show that all of the variables are not stationary at the same level.

### **ADF Results at First Difference**

Following the unit root testing at the level, it is tested once more for the first difference. The unit root test at first difference results are shown in Table 4.5 with intercept, with intercept and trend, and without intercept or trend.

The results show that all variables are stationary at the first difference. All variables are integrated into order 1, or I (1), in conclusion.

### Lag Length Selection Criteria

Before confirming cointegration between variables, the lag structure of the VAR (Vector Autoregressive Model) should be examined using the Schwarz Criterion. Statistics for various lag length criteria are shown in Table 4.6. The cointegration outcomes favor SC (Schwarz Criterion) of VAR lag order 1, as indicated by the asterisk (\*).

### Unrestricted Cointegration Rank Test (Trace Statistic)

Johansen The cointegration test was used to count the amount of cointegrating vectors among variables of the model by using Trace statistics. Unrestricted Cointegration Rank Test (Trace) results are obtained for the aforesaid model given in Table 4.7, which indicates 3 cointegrating equations at the 0.05 level.

### Unrestricted Cointegration Rank Test (Max Eigen Value)

Using the Maximum eigen statistic, the Johansen Cointegration test was run to count the number of cointegrating vectors between the variables. The Johansen test was applied to the aforementioned model, and the results are shown in Table 4.8. At the 0.05 level, Table 4.8 shows 3 cointegrating equations.

### Long-Run Relationship

The Johansen cointegration test was used to find the slope coefficients of the independent variables in this study or to ascertain the long-term relationship between the dependent and independent variables. Table 4.9 displays the long-term coefficient estimates for the regression model, where the CPI is the dependent variable and the interest rate, domestic debt, indirect tax revenue, and political stability are the independent variables. The long-term findings indicate that there is a significant and long-term negative correlation between interest rates and Inflation. According to its coefficient, a one-unit increase in interest rates will cause the inflation rate to fall by 5%.

Domestic debt is also significant and has a long-term negative association with inflation; according to its coefficient, a one-unit increase in domestic debt will result in a  $2.29 \times 10^{-13}$  decrease in inflation. However, indirect tax income is significant and has a long-term, positive relationship with the CPI. According to its coefficient, a one-unit rise in indirect tax will result in an inflation rate increase of  $3.68 \times 10^{-12}$  percent.

Political stability has a significant effect on inflation and has a negative correlation with it; according to the coefficient, a rise of one unit in the political stability index will result in a 176% decrease in inflation in Pakistan.

### Short Run Estimates

The short-term relationship between the dependent and independent variables as well as the short-run equilibrium for the model in this study are both determined using the Vector Errors Correction Model (VECM). The initial difference state that each variable plus the lagged value of the residual from the co-integrating regression (et-1). The model has been used with a vector error correction technique.

In Table 4.10, the interest rate of the lag order 1, domestic debt of the lag order 1, and political stability of the lag order 1 are all negatively correlated with inflation, but the short-term correlation for indirect tax revenue of the lag order 1 is positively correlated. The T-ratios in the table indicate that the interest rate and indirect tax revenue have insignificant impacts, while the rest of the variables have a significant impact on inflation in the short run. The value of the vector error correction term (CointEq1) is -0.034816, with a t-value of -6.43835, indicating short-run disequilibrium with the correct sign of convergence.

## CONCLUSION

Macroeconomic policies aim to achieve a number of objectives, including high economic growth and low inflation etc. Inflation Targeting (IT) was effectively applied in certain affluent nations in the 1990s after monetary



aggregate and nominal exchange rate targeting failed to lower inflation rates. This encouraged emerging and transitional countries to combat high inflation rates.

This study attempts to investigate how interest rates, domestic debt, indirect tax revenue, and political stability affect inflation in Pakistan in the long run in order to evaluate the effectiveness of inflation targeting policies in Pakistan. The study used annual time series data sets from 1980 to 2020 that were sourced from different national and international data sets and employed the Johansen tests of co-integration to investigate the model. The computer software EViews 10 is used to accomplish the analysis. A descriptive analysis was carried out to check the normality of the data. The correlation matrix is used to check the multicollinearity among the regressors of the model. The ADF test was also conducted to ensure that all the variables in the models were stationary before the co-integration analysis. In setting up the proper lag time for the model involved in the current research study, VAR (Vector Autoregressive) lag order is employed. On the basis of the Schwarz criterion (SC), optimal lag length 1 is selected in the model. Using trace and maximum Eigen value statistics, the co-integrating equations between the variables are found in order to evaluate the model's long-run coefficients. In order to compute estimated long-run coefficients for the inflation targeting model, the Johansen system of co-integration was used. According to the hypothesis of this study, the model's results show that interest rates have a negative and significant impact on inflation in Pakistan. Its coefficient shows that a one-unit increase in interest rates will result in a 5 percent decrease in inflation. The primary objective of the study is to establish a stable long-term equilibrium between the nominal interest rate and inflation, or, in other words, to check the validity of Fisher Hypothesis for Pakistan (Zaman & Atif, 2014). The same negative relationship between interest rate and inflation was also stated by Mahmood et al. (2013) and Rodgers (2022).

Inflation in Pakistan has been negatively and significantly impacted by political stability. According to the political stability coefficient, Pakistan's inflation will fall by 176% for every unit increase in the political stability index. Inflation can be decreased by maintaining political stability, according to Mazhar & Jafri (2017). Additionally, Imran, Murtiza, and Akbar (2023) looked into how political unrest affects prices.

In Pakistan, there is a significant and negative correlation between domestic debt and inflation. Its coefficient shows that a one-unit rise in domestic debt will result in a  $2.29 \times 10^{-13}$  percent decrease in inflation. Wheeler (1999) also showed how large public debt levels have a negative and considerable impact on interest rates, price levels, and economic output.

Although indirect tax revenue and inflation have a long-term, positive, and significant association, according to its coefficient, a one-unit rise in indirect tax will result in an inflation rate increase of  $3.68 \times 10^{-12}$  percent. Indirect taxes increase the cost of manufacturing, which reduces the appeal of investing because goods can no longer be priced competitively. As a result, indirect taxes worsen the decline in output and investment, increasing costs and inflation (Madni, 2014). Modzierz (2017) also looked into whether indirect taxes contributed to inflation.

## Policy Suggestions

Based on the hypothesis formulated, this study supports the idea that any rise in interest rates and political stability lowers inflationary pressure in Pakistan. The takeaway for economic planners is that by regulating the interest rate and achieving a stable political system, inflation-targeting policies may be beneficial. Therefore, interest rates and political stability are crucial policy factors for long-term inflation management. On the basis of the study results, it may have been suggested that:

1. The government and policymakers may develop strategies to control and manage the country's interest rates because they have a significant impact on inflation in Pakistan. One way to address this is to ensure that interest rates are set at an appropriate level to effectively target inflation in the country. But this could be done by giving the State Bank of Pakistan (SBP) complete autonomy.
2. Pakistan's inflation is significantly influenced by domestic credit. It is possible to make sure that credit is distributed effectively and that the financial industry is adequately regulated. The regulatory environment for

banks and other financial institutions might be strengthened, and competition in the financial industry might be promoted.

3. Taxes can have a significant impact on inflation as well. Make sure taxes are set at an appropriate level in order to handle this. This could be achieved by reforming the tax system's effectiveness and equity, lowering tax evasion, and encouraging tax compliance. Instead of indirect taxes, direct taxes may be preferable. In order to reduce the country's budget imbalance and lower inflation, the government may reduce non-developmental spending. Reduced public spending can lower inflationary pressures by lowering demand.

4. Economic stability requires political stability, which is a prerequisite. Therefore, we may support democratic institutions and make sure they perform well in order to increase political stability. To achieve this, the government should be held more transparent and accountable, free and fair elections could be encouraged, and the rule of law would be enforced.

## Future Avenues

Theoretically, the link between interest rates and inflation is inverse: when interest rates are low, inflation increases; when interest rates are high, inflation decreases (Rodgers, 2022). This association is supported by the research. Pakistan's financial situation was entirely different after 2020. According to the State Bank of Pakistan (2023) reports, interest rates in Pakistan are rising slowly, from 19.85 percent in February 2023 to 21% in March 2023 and 22% in June 2023. The inflation rate increased, according to the Pakistan Bureau of Statistics (2023) reports, to 31.5 in February, 35.4 in March, and 38 in May 2023. The reading was the highest since December 1973. Thus, it is in contradiction with economic theory. Therefore, future research studies must follow these lines of inquiry in order to explain this riddle.

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## APPENDICES

Table 4.1 Normality Test for Model (LCPI)

	<i>LCPI</i>	<i>INTEREST_R</i> <i>ATE</i>	<i>DOMESTIC_D</i> <i>EBT</i>	<i>IND_TAX_REV</i>	<i>POL_STABILITY</i>
<i>Mean</i>	3.747590	10.24644	5.01E+12	4.22E+11	-1.694227
<i>Median</i>	3.770729	10.00000	1.59E+12	4.20E+11	-1.638077
<i>Maximum</i>	5.298712	18.87500	2.61E+13	7.89E+11	-0.731418
<i>Minimum</i>	2.218078	0.000000	1.14E+11	2.08E+11	-2.810035
<i>Std. Dev.</i>	0.946209	4.547554	6.88E+12	1.32E+11	0.641944
<i>Skewness</i>	0.033354	-0.670359	1.631669	0.708539	-0.282674
<i>Kurtosis</i>	1.754397	3.593249	4.682079	3.493203	1.681550
<i>Jarque-Bera</i>	2.658127	3.672012	23.02622	3.846069	3.515631
<i>Probability</i>	0.264725	0.159453	0.000010	0.146163	0.172421
<i>Sum</i>	153.6512	420.1042	2.05E+14	1.73E+13	-69.46330
<i>Sum Sq. Dev.</i>	35.81243	827.2100	1.90E+27	7.01E+23	16.48371
<i>Observations</i>	41	41	41	41	41

Sources: Authors own calculations.

Table 4.2 Normality Test for Model (LCPI)

	<i>LCPI</i>	<i>INTEREST_RATE</i>	<i>DOMESTIC_DEBT</i>	<i>IND_TAX_REV</i>	<i>POL_STABILITY</i>
<i>Jarque-Bera</i>	2.658127	3.672012	23.02622	3.846069	3.515631
<i>Probability</i>	0.264725	0.159453	0.000010	0.146163	0.172421
<i>Observations</i>	41	41	41	41	41

Sources: Authors own calculations.

Table 4.3 Multicollinearity Test for Model

	<i>LCPI</i>	<i>INTEREST_RATE</i>	<i>DOMESTIC_DEBT</i>	<i>IND_TAX_REV</i>	<i>POL_STABILITY</i>
<i>LCPI</i>	1	0.4318205907310297	0.8336513026680861	0.5701595004365856	-0.810138285600647
<i>INTEREST_RATE</i>	0.4318205907310297	1	0.7359407377329742	-	0.2134555729034762
<i>DOMESTIC_DEBT</i>	0.8336513026680861	0.7359407377329742	1	0.645720424298605	-
<i>IND_TAX_REV</i>	0.5701595004365856	0.5530691567628233	0.645720424298605	1	-
<i>POL_STABILITY</i>	0.810138285600647	0.2134555729034762	0.5484423740683993	0.3272499834349122	1

Sources: Authors own calculations.

Table 4.4 ADF Test Results at Level ( $\alpha=0.05$ )

<i>Variables</i>	<i>Test Equation</i>	<i>ADF Statistics</i>	<i>Critical Value at 5%</i>	<i>Result</i>
<b>LCPI</b>	<i>With Intercept</i>	0.292324	-2.938987	Non Stationary
	<i>With Intercept &amp; Trend</i>	-2.931043	-3.529759	
	<i>None</i>	2.094922	-1.949609	
<b>Interest Rate</b>	<i>With Intercept</i>	-2.222353	-2.938987	Non Stationary
	<i>With Intercept &amp; Trend</i>	-2.454572	-3.529758	
	<i>None</i>	-0.535666	-1.949319	
<b>Domestic Debt</b>	<i>With Intercept</i>	1.929575	-2.938987	Non Stationary
	<i>With Intercept &amp; Trend</i>	0.077786	-3.529758	
	<i>None</i>	2.773725	-1.949609	
<b>Indirect Tax Revenue</b>	<i>With Intercept</i>	-1.883128	-2.936942	Non Stationary
	<i>With Intercept &amp; Trend</i>	-2.265086	-3.526609	
	<i>None</i>	0.300631	-1.949319	
<b>Political stability</b>	<i>With Intercept</i>	-1.339360	-2.936942	Non Stationary
	<i>With Intercept &amp; Trend</i>	-0.438406	-3.526609	
	<i>None</i>	0.164534	-1.949319	

Sources: Authors own calculations.

Table 4.5 A DF Test Results at First Difference ( $\alpha=0.05$ )

<i>Variables</i>	<i>Test Equation</i>	<i>ADF Statistics</i>	<i>Critical Value at 5%</i>	<i>Result</i>
<b>LCPI</b>	<i>With Intercept</i>	-2.985467	-2.938987	Stationary
	<i>With Intercept &amp; Trend</i>	-2.922032	-3.529758	
	<i>None</i>	-1.229044	-1.949609	
<b>Interest Rate</b>	<i>With Intercept</i>	-4.592059	-2.938987	Stationary
	<i>With Intercept &amp; Trend</i>	-4.547634	-3.529758	
	<i>None</i>	-4.6558544	-1.949609	
<b>Domestic Debt</b>	<i>With Intercept</i>	-2.699317	-2.938987	Stationary
	<i>With Intercept &amp; Trend</i>	-3.482559	-3.429758	
	<i>None</i>	-1.905314	-1.949606	
<b>Indirect Tax Revenue</b>	<i>With Intercept</i>	-6.714863	-2.938987	Stationary
	<i>With Intercept &amp; Trend</i>	-6.622902	-3.529758	
	<i>None</i>	-6.681283	-1.949609	
<b>Political stability</b>	<i>With Intercept</i>	-4.773233	-2.938987	Stationary
	<i>With Intercept &amp; Trend</i>	-4.889422	-3.529758	
	<i>None</i>	-4.804692	-1.949609	

Sources: Authors own calculations.

**Table 4.6 VAR Lag Order Selection Criteria**

<i>Lag</i>	<i>LogL</i>	<i>LR</i>	<i>FPE</i>	<i>AIC</i>	<i>SC</i>	<i>HQ</i>
0	-2322.411	NA	1.09e+47	122.4953	122.7108	122.5720
1	-1979.033	578.3204	5.82e+39	105.7386	107.0314*	106.1986
2	-1944.005	49.77589*	3.69e+39	105.2108	107.5810	106.0541*
3	-1912.584	36.38294	3.20e+39*	104.8728*	108.3204	106.0994

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Sources: Authors own calculations.

**Table 4.7 Unrestricted Cointegration Rank Test (Trace)**

a

<i>HYPOTHESIZED NO. OF CE(S)</i>	<i>EIGENVALUE</i>	<i>TRACE STATISTIC</i>	<i>0.05 CRITICAL VALUE</i>	<i>PROB.**</i>
None *	0.719341	120.4074	69.81889	0.0000
At most 1 *	0.570913	70.85341	47.85613	0.0001
At most 2 *	0.465157	37.85565	29.79707	0.0048
At most 3	0.214342	13.45012	15.49471	0.0993
At most 4 *	0.098452	4.042024	3.841466	0.0444

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level in the above table 4.7.

\* denotes rejection of the hypothesis at the 0.05 level

\*\* denote MacKinnon-Haug-Michelis (1999) p-values

Sources: Authors own calculations

**Table 4.8 Unrestricted Cointegration Rank Test (Maximum Eigenvalue)**

<i>Hypothesized No. of CE(s)</i>	<i>Eigenvalue</i>	<i>Max-Eigen Statistic</i>	<i>0.05 Critical Value</i>	<i>Prob.**</i>
None *	0.719341	49.55403	33.87687	0.0003
At most 1 *	0.570913	32.99776	27.58434	0.0091
At most 2 *	0.465157	24.40553	21.13162	0.0167
At most 3	0.214342	9.408094	14.26460	0.2538
At most 4 *	0.098452	4.042024	3.841466	0.0444

In the above table 4.8, Rank Test(Maximum Eigen-Value test) indicates 3 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\* denote MacKinnon-Haug-Michelis (1999) p-values

**Table 4.9 Johansen Normalized cointegrating coefficients (Dependent Variable: CPI)**

<i>S.NO</i>	<i>VARIABLE</i>	<i>COEFFICIENT</i>	<i>S.E</i>	<i>t-STATISTIC</i>
1	INTEREST_RATE	-0.054267	0.02872	-1.889**
2	DOMESTIC_DEBT	$-2.29 \times 10^{-13}$	$5.1 \times 10^{-14}$	-4.48456
3	IND_TAX_REV	$3.68 \times 10^{-12}$	$6.7 \times 10^{-13}$	5.46063
4	POL_STABILITY	-1.763856	0.18290	-9.64368

\*\* indicate that the variable is significant at 06%

Sources: Authors own calculations.

**Table 4.10 VECM RESULTS (Dependent Variable: D (LCPI))**

<i>S.NO</i>	<i>VARIABLE</i>	<i>COEFFICIENT</i>	<i>S.E</i>	<i>t-STATISTIC</i>
1	<i>D(INTEREST_RATE(-1))</i>	-0.001813	0.00253	-0.71590
2	<i>D(DOMESTIC_DEBT(-1))</i>	-3.87E-14	6.5E-15	-5.97648
3	<i>D(IND_TAX_REV(-1))</i>	6.67E-14	4.8E-14	1.40150
4	<i>D(POL_STABILITY(-1))</i>	-0.075384	0.02193	-3.43733
5	<i>CointEq1</i>	-0.034816	0.00541	-6.43835

Sources: Authors own calculations.