Investigating the Relationship between Inflation and Economic Growth: A Case of Pakistan

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ABSTRACT: We re-evaluate empirically the relationship in inflation, and economic growth for Pakistan over the period of 1985 to 2019. Using the Autoregressive Distributive Lag (ARDL) method, this study used the Wald and F-Bound test to find out long-term relationships between these variables and investigate the effect of Inflation over Pakistan economic growth and trade. Our result indicates inflation is negatively affecting economic growth and terms of trade in long run. The results showed that a moderate level of inflation is beneficial for growth and trade while high level or double-digit figure inflation harmful for Pakistan economy. According to the results of the study, inflation is away from its equilibrium value. Error correction term "- 0.16" reveals that 16 percent adjustment has been occurred during the year in the short run-in economic growth. This study also shows that inflation and terms of trade volatility in Pakistan has negative relation. When inflation increases terms of trade decreases and vice versa. It reveals that a low and stable rate of inflation boost the trade which leads to prosperity of the countrymen while high rate of inflation is detrimental for economic growth and trade.

KEYWORDS: Inflation rate, growth rate, trade, Pakistan, time series data, Autoregressive Distributive Lag (ARDL)

1. Introduction

Inflation refers to an increase in the price of consumable goods and services over a time interval. Economists are very interested in examining the relationship between inflation and economic growth. One of the main reasons behind this is the fact that the conduct of monetary policy is largely considered to have important consequences for long-term economic growth. Economic growth and inflationary relations have been closely monitored in the economy. When Inflation reaches a peak, it curbs productivity and growth whereas a low and stable inflation rate contributes to economic growth. The high inflation rate affects the decision-making of almost all economic actors such as consumers, producers, and investors due to uncertainty about the expected consequences of their actions [1].

Fisher (1993) concluded that growth is reduces by inflation due to which it curb productivity and investment. He added that, small fiscal deficits and low inflation rates are not mandatory for good growth even over in long runs; likewise, high inflation which is not consistent with continued economic growth [2]. Less than two to three percent inflation and

growth are positively related [3]. Growth represents an increase in revenue. In many cases, access to goods and services is a measure of normal life. Macroeconomic factor, such as inflation rate, relevant when considering economic development [4].

Previous studies found that the ratio of people who believe inflation is detrimental for economic growth is high than tangible evidence. They examined special cases of inflation and finds that during high inflation growth falls relatively while it recovers strongly same with as inflation falls and the ratio of people who believe inflation is harmful to economic growth to tangible evidence is unusually high [5,6]. Their investigation confirmed with the previous observation that the inflation-economic growth relationship is influenced by countries with extreme values [7]. Thus, they examined only cases of discrete high-inflation (> 40%) crises and found that growth falls sharply during high-inflation crises, then recovers rapidly and strongly after inflation falls [5].

Inflation reduced growth with the aid of lowering investment and productiveness boom. He in addition notes that, low inflation and small financial deficits are not essential for excessive increase even over long periods. Excessive inflation isn't always constant with sustained monetary growth. The use of huge panel dataset, protecting IMF member countries over 1960 to 1996, located tshat at very low inflation rates (less than 2-three in keeping with cent) inflation and growth are definitely correlated, but they may be negatively correlated at high level of inflation [3]. Similarly, the empirical consequences of previous studies proposed that inflation in the single figure can be beneficial, even as inflation in the double figure reduces the growth. many other previous studies used observe close association between inflation rate, trade and economic growth for different countries [8-15].

The goal of policy makers is to continue with high economic growth and low inflation (Pakistan Economic Survey report 2007-08). The factors which influence the rate of inflation in the world have been widely discussed. There are two major factors of Inflation; one is increase in demand or due to supply; second is cost and Demand full inflation. Better growth is possible without increasing inflation, if potential output of the economy is increasing with demand. This article analysis the relationship between Inflation and Economic growth for Pakistan. Inflation plays a vital role in the determination of economic growth and the proper distribution of income. The primary goal is to attain high and sustained economic growth with low inflation. Inflation in Pakistan is rising. Mostly it is due to increase in food items prices. It is also due to less production of agricultural goods or due to shortage of goods and services in the economy. Rapid increase in import and their prices also affecting inflation while depreciating exchange rate in this scenario putting pressure overgrowth or economy [16].

Throughout its history, Pakistan experienced uneven growth patterns. Its Average growth is 5.5 % during last fifty years. There are not only gaps between receipts and public expenditures, investments and savings, capital formation and population growth but also it do not succeeds in establishing financial markets. Therefore, it looks difficult to achieve task of sustainable growth pattern in the country. High inflation rates also are the main reasons for that. Inflation rates during last 45 years are averaged around 8 % and this is ill for economy. The relative price of exports to imports is terms of trade (TOT); it indicates relation between the products that are traded by two countries with each other quantitatively. An improvement in the country's TOT is the increase in price of exports than imports, which means more foreign exchange is earning by the country than outgoings [17].

Pakistan's TOT has been in worse condition over the years because its main exports are agricultural products whose prices are relatively low and changing by time. It's dependency is on imported machinery which price has increased by time. In Pakistan inflation is raising at rapid space, the main reason for which is increase in food prices. High fluctuation in TOT, escalating world demand for domestic exports, Political destabilization also are the reasons [18]. Inflation was low from 1970 t0 1980 due to strict monetary policy and other factors, while during 1990s High Inflation was correlated with deprecation of the domestic currency. In 2005 it escalated due to decreases in export compared to imports, increase in oil prices, decrease in foreign capital investments and poor supply of food, nonfood items. During 2005–12, it entered in double digit together by food and nonfood items. High oil prices, the depreciation of the domestic currency, instability in the country, the deterioration in the Balance of payment, monetary expansion are the main reasons for inflation in Pakistan [19]. Previous study also found that there is a negative relationship between the economic growth and inflation rate. It implies that increasing inflation rate above double digit has negative effect over economic growth. Further they argued that inflation in its milder sectors, does not affect economic growth, whereas high inflation rates adversely affect long-run economic growth [20]. Inflation rate when exceeds 12.3% and is below 5.4% is detrimental for economic growth. Other factors also influence the growth rate such as interest rate and unemployment rate. Previous study found that energy has a significant positive impact on economic growth as it is vital production factor with human and physical capital. An increase in energy consumption by 1% promotes real GDP per capita by the same number of coefficients of energy consumption [21]. The broad objectives of this study are to investigate the Inflation, growth and trade relationship for Pakistan, and to suggest some policy suggestions for Policy makers.

2. Methodology

This study used the Cobb-Douglas Production Function. Cobb-Douglas production function was developed by Charles W. Cobb (mathematician) and Paul H. Douglas (economist) in 1928 .It is widely used in economic studie which describes production is a function of capital and labor.

$$Y= A(LK) \tag{1}$$

As the Production is output, Capital and labor are inputs in the Model which indicates that Production is explained by Capital and labor. Now we are going to find out the effects inflation over economic growth so we assume and replace the Production by Economic growth(GDP growth) Y and capital by inflation, Economic Growth is dependent Variable while inflation is explanatory variable. By Using the Cobb-Douglas Production Function then the model specified as follow [3,4,15,21-24].

$$Y=\alpha+\beta inf \ \beta o(inf - K)+ \text{€}t \tag{2}$$

Where, Y=GDP Growth rate %(Annual) is dependent variable, Inf=inflation rate %(Annual) Independent/Explanatory variable, €t= error term, Dummy variable D = 1 if INFLR > K, D = 0 if INFLR ≤ K, " €t" is the random error.

3. Estimation techniques

To estimate the effect of inflation on economic growth, this study initially used the Augmented Dickey Fuller test for the unit root to test whether variables are stationary or non-stationary. avid In 1979 Dickey and Wayne Fuller, developed the test, this test is used to determine whether a unit root exists in the autoregressive model. Gross domestic product (GDP) Growth rate is stationary at level while inflation is at first difference. Wald and F-Bound test was conducted to check the long run relation between the variables While Auto regressive distributive lag (ARDL) model is used for interpretation. Using the ARDL method, this study used the Wald test to find long-term relationships between variables.

3. Results and Discussion

3.1. Unit root tests

By basic theory of stationary test, the Augmented Dickey-Fuller unit roots test is applied to check whether variables are stationary at levels or at the first difference. GDP Growth rate is stationary at level while inflation is stationary at 1st difference; hence model is mixture of stationary and non-stationary variable, so we used Autoregressive Distributive Lag (ARDL) model technique.

Table 1. Augmented Dickey-Fuller Results

Variables	Level	1st Diff
GDP Growth	-3.741***	
Inflation	-2.626	-6.623***

Table 2. Descriptive Statistics

Item	GDP	Inflation
Mean	4.486952	8.079389
Median	4.731147	7.844265
Maximum	7.705898	20.28612
Minimum	1.014396	2.529328
Std. Dev.	1.881462	3.921934
Skewness	-0.100571	0.727595
Kurtosis	2.256707	3.777396
Jarque-Bera	0.864709	3.969471
Probability	0.648979	0.137417
Sum	157.0433	282.7786
Sum Sq. Dev.	120.3566	522.9733
Observations	35	35

For making a good point about an annual time series; "data is more accurate and error-free" descriptive statistics test has been applied to the GDP growth rates and inflation rates. It explains that mean and standard deviation changes with time and the series are normally distributed, listed in Table 2.

Table. 3 ARDL.

Variable	Coefficient	Std. Error	t-Statistic	Probability
GDP Growth rate	0.344	0.156	2.204	0.035
Inflation Rate	-0.160	0.071	-2.243	0.032
Constant	4.128	1.013	4.074	0.000

$R^2 = 0.26$ Durban Watson=1.84

According to ARDL model results it is clear that inflation has negative significant impact over GDP. Table 3 indicates that inflation Coefficient 0.16 means one percent increase in inflation brings reduction in GDP growth by 0.16 percent. R^2 In the table shows that independent variable explained variation in Dependent variable. Relationship is negative between inflation and growth as it is obvious from negative sign.

Table 4. Wald Test Results

Test Statistic	Value	df	Probability
F-statistic	14.773	(1,28)	0.0006
Chi-square	14.773	1	0.0001

The Wald test F-statistics is 14.773 which is higher than the lower and upper bond values, it identifies that there is co-integration between the variables and it also shows that there is a long run relationship between the variables.

Table 5. F-Bound Test Results

Test Statistic	Value	k
F-statistic	7.088	1
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	3.02	3.51
5%	3.62	4.16
2.5%	4.18	4.79
1%	4.94	5.58

Table 5 indicates that F-statistics value is 9.677 which is greater than critical value Bounds at 5% i.e $7.088 > 3.62$ and $9.677 > 4.16$, so this indicates that Inflation has a long run impact over GDP growth.
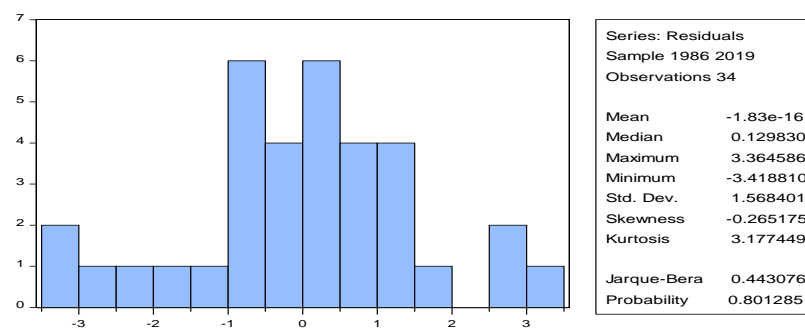

Figure 1. Histogram Normality test Results

The histogram normality test is used to check whether data is normally distributed or not. The results of Table 5 show that the data is normally distributed as the probability value is 0.801, which is greater than 0.05 percent. Therefore, we can't reject the null hypothesis that data is normally distributed. The skewness value is -0.26, which is close to 0, and the kurtosis value is almost near to 3 (Fig. 1).

Pakistan's growth patterns have been inconsistent throughout its history. It has grown at an average rate of 5.5 % over the last 50 years [25]. Not only does it fail to establish financial markets, there are gaps between receipts and public expenditures, investments and savings, capital formation and population growth. As a result, achieving a sustainable growth pattern in the country appears difficult. Additionally, high inflation rates are a primary reason for this.

Inflation rates have averaged around 8% over the last 45 years, which is detrimental to the economy.

Table 6. World Bank data and report Pakistan Trade balance

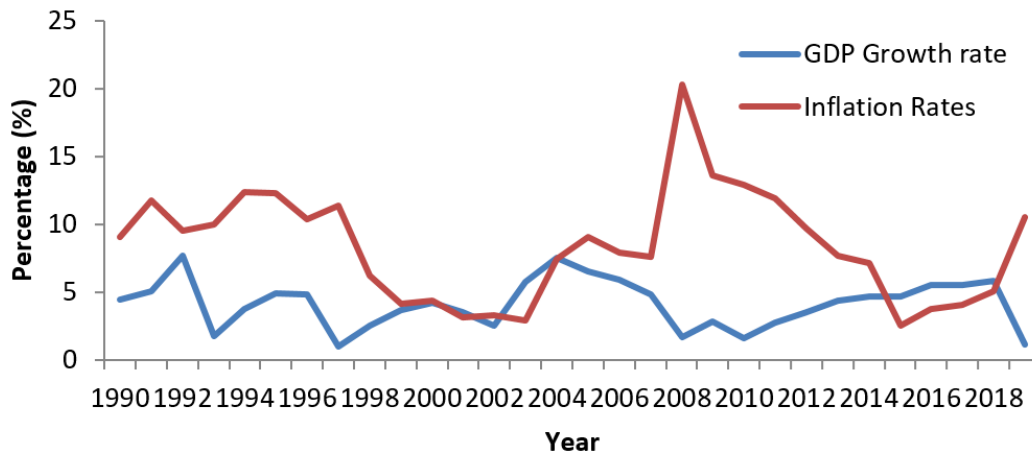| Name of Year	Trade Balance Amount in US $(Billions)	Percentage of Decline
2020	$-18.60B	34.45% from 2019
2019	$-28.38B	18.72% decline from 2018
2018	$-34.92B	22.76% increase from 2017
2017	$-28.44B	45.5% increase from 2016

Figure 2. Pakistan Inflation and Growth Rate Line Graph from 1990-2019

Pakistan has continued with inflation between 9.97% to 12% during 1990 to 1997 (Fig. 2). While GDP growth was unstable and has decreased to 4% to 1% round about respectively. In 1990's lowest figure was 1.01% while high figure was 7.71% in 1992. Afterwards 1990's inflation rates were reduced to 4.5% except in 2005 (9.06%), While the GPD growth rate was increased of Pakistan as it was 8.25% in 2004-2005. In 2008-09, inflation was 20.3 percent, while GDP growth was 1.7 %. Between 2010 and 2018, GDP growth increased at a constant rate of 1.6 % to 5.8 %, while inflation decreased from 12.9 % to 5.08 %. By plotting their trends over time, the relationship between growth and inflation can be understood [26]. Previous studies discovered that inflation rates greater than 11% are detrimental to economic growth and development. There was a positive relationship up to 7% inflation and a negative relationship above that [26,27]. Other studies discovered that for the economies of Sri Lanka, Pakistan, Bangladesh, and India, there is a long and short run relationship between economic growth and inflation. They discover that inflation in the analyzed countries has a positive relationship with saving but a negative relationship with economic growth. They determined that 9% inflation is a reasonable and manageable level for Pakistan. Inflation of up to 9% is beneficial to the Pakistani economy [28,29].

4. Conclusion

This study shows that GDP growth is stationary at level while inflation is stationary at first difference. The ARDL results shows that co-integration exist between the variables that shows there is a long run relationship between the variables. High coefficient of inflation is found in this study which is negative too. It states that when inflation exceeds from single digit it will be detrimental for economic growth. Taking the annual growth rate of inflation as the threshold variable and Exploring the effects of financial development on economic growth under various

Inflation regime, estimation results show that when the threshold level of inflation is less than 10%, financial growth can boost economic growth for Pakistan. GDP growth is a key tool to increase global savings. Therefore the necessary steps should be taken by the government to maximize the effect of increasing public and private sector savings. Other appropriate measures should be taken to lower real interest rates and increase economic growth and inflation.The determinant of inflation which has Negative impact must be controlled to increase stability in the economy. Government and Public must control the population growth rate.Higher inflation rate is very harmful for economic growth, so government also control the inflation rate.The findings of this study support the Monetary-lead hypothesis and suggest that the government should focus not only on the development of the financial sector, but on other macroeconomic policies with a stable exchange rate. Negative high coefficient of inflation suggests policy makers to reconsider existing Macro-Economic Policy.

Competing Interest

Author declare no competing interest.

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