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Revisiting Inflation-Growth Nexus in Pakistan

Noor Jehan[1],Tariq Ahmad[2], Faheem Zeb[3], Beenish Shuja[4]. Sidra Shahnawaz[5]

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Growth rate, Pakistan, time-series data, Nexus. inflation, ARDL

ABSTRACT

The inflation-growth nexus is a highly debatable topic among economists. Various school of thoughts have varying views about the relationship between economic growth and inflation. While the classical economists had a view that the relationship between inflation-growth as positive, Keynesian claim a negative nexus. There is a plethora of research on the relationship and dependencies among macroeconomic variables. The volatile nature of the macroeconomic variables necessitates to revisit the relationship each new day. Studies related to Pakistan are also evidence that macroeconomic variables, of which inflation and economic growth is a very popular topic, has been the focus of research. However, the recent studies did not report the inflation-growth nexus; shifting the subject of research towards the inclusion of other variables which are also important but not as much as a growth-inflation nexus. Hence, in the present study attempt is made to enquire about the relationship between inflation and economic growth in the case of Pakistan. The research is based on log run time-series data for 1985-2019. ARDL, Wald, and F-bound statistics were used for finding a long-term relationship between variables. The results reveal that inflation has a strong negative effect on economic growth. The descriptive statistics showed that the GDP data is consistent and stationary at level. The inflation data was not stationary at level and had a higher standard deviation. However, both the series were normally distributed. The value of "-0.16" reveals that there has been a 16% yearly adjustment to economic growth in the short run. The study suggests keeping inflation at low levels for better growth and terms of trade.

INTRODUCTION

Inflation shows a continuous rise in the price of goods and services in a financial year (Furtado, 2018). Financial experts and economists are very interested in this field of research

[1] *Assistant professor, Abdul Wali Khan University. Email: noorjehan@awkum.edu.pk*

[2] *Scholar, Abdul Wali Khan University. Email: tariq_zeb555@gmail.com*

[3] *Assistant Professor, Abbottabad University of Science and Technology. Email: faheemzebkhan@gmail.com*

[4] *Lecturer, Iqra National University, Email: beenish.shuja@gmail.com*

[5] *Assistant, Higher Education Department, KP. Email: haleemas444@gmail.com*

partly because monetary policy has long-term consequences for the economy and economic growth is very dependent on inflation. Inflationary trends and economic growth are the most monitored statistics in the economy. The peak level of inflation curbs growth and productivity while there is economic stability when inflation is low and stable. The economic actors are affected by high inflation and the decision-making power of consumers, producers, and investors are largely affected. Policymakers aim at high economic growth and low inflation (Pakistan Economic Survey report 2007-08).

The factors which influence the rate of inflation are also widely discussed. There are two major factors of Inflation; that is when there is an increase in the demand and when there is an increase in supply; cost and Demand full inflation. Better growth is possible without increasing inflation if the economy's potential output is increasing with demand (Laurence and Mankiw, 2002). Research confirms that the relationship between inflation and economic growth is one of the top debated and researched phenomena. Different schools of economics claim different views. It is claimed by Keynesians that there is a positive relationship between the two. While classical claims a negative relation (Karahan & Çolak, 2020).

Inflation plays a vital role in the determination of many macroeconomic indicators like the gross domestic product, proper income distribution, and public well-being. The primary goal of all the policymakers is the attainment of low levels of inflation with sustained and greater levels of economic growth (Brian et all,2001). If we talk of inflation in Pakistan, it is rising. Mostly it is due to a rise in food items prices. It is also due to less production of agricultural goods or due to a shortage of economic goods (services as well) in the economy. The rapid increase in import and their prices also affect inflation while depreciating the exchange rate in this scenario putting pressure on growth or economy (Al-Abdulrazag, 2007).

Throughout its history, Pakistan experienced uneven growth patterns. Its Average growth is 5.5 percent during the last fifty years. The achievement of sustainable growth patterns in such scenarios becomes difficult. High inflation rates also are the main reasons for that.

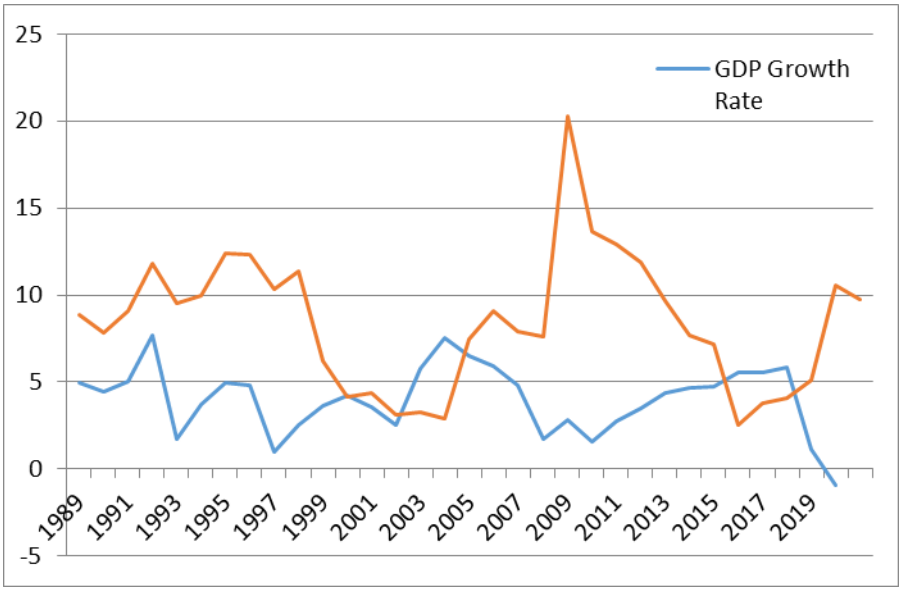
Pakistan depends on agricultural products for its exports which are a means of earning for the country. The prices, however, are mostly low, volatile, and uncertain. The prices in the county however rise rapidly. One of the reasons is the imported machinery, second is the dependence on imports. Inflation is in some view caused by High fluctuation in TOT, escalating world demand for domestic exports, and political destabilization are the reasons (Fatima, 2010

Monetary policy was kept strict and hence inflation was low from 1970 to 1980. while during the 1990s high Inflation was correlated with the deprecation of the domestic currency. In 2005 it escalated due to decreases in export compared to imports, an increase in oil prices,

a decrease in foreign capital investments, and a poor supply of food, and nonfood items. During 2005–2012, it enters in double-digit together by food and non-food items. High oil prices, the depreciation of the domestic currency, instability in the country, the deterioration in the Balance of payment, and monetary expansion are the main reasons for an inflation in Pakistan (Hasan, Khan, Pasha, & Rasheed, 1995). Khan and Khan (2018) also found an inverse relationship between economic growth and the inflation rate in Pakistan. It implies that increasing the inflation rate above double-digit has a negative effect on 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.

Pakistan has continued with inflation between 9.97% to 12% from 1990 to 1997. While GDP growth was unstable and has decreased from 4% to approximately 1% respectively. In the 1990s, the lowest figure was 1.01% while the high figure was 7.71% in 1992. Afterward 1990's inflation rates were reduced to 4.5% except in 2005(9.06%), While the GPD growth rate was increased at 8.25% in 2004-05. Inflation rate was 20.3% in 2008-09 while GPD growth rate was 1.7%. From 2010 to 2018 GDP growth rate was recorded 1.6% to 5.8% respectively while Inflation rate was decreased from 12.9% to 5.08 %(World Bank Data).

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



There are various theories related inflation and the economy. One of which is fiscal dominance. It postulates that the deficit financing in developing countries creates a situation in which government creates money and hence inflationary pressure. This theory was proved by (Batool et al., 2022) for Pakistan taking data for the period from 1971-2020 while employing ARDL approach. Increasing inflation hampers economic growth in the long-run (Hussain et al., 2019). As the volatility of the macroeconomy is a fact, every new study can give a

new insight into such and important nexus. According to Azam and Khan (2020) an inflation rate above 12.3% is harmful to the economy and it is also not good if it drops below 5.4%. they further find that economic growth is affected by energy besides inflation as it is a necessary item of production. So, if energy is increased by 1%, it will have a similar effect on real GDP expansion. Affective macroeconomic policy need is imperative for controlling inflation.(Azam Khan & Khan, 2018). New studies are necessary for policy recommendations.

Problem Statement

Although literature is abundant on economy's determining variables, the continuous changes in the outside world, necessitates updates on regular basis. Inflation is a continuously changing phenomenon, so is economic growth. Studies regarding Pakistan has drifted from the duo nexus and has focused on other variables in relation to either inflation and/or economic growth. A gap is felt in the recent times and a need to fill this. The study effort will add to the already existing knowledge and either confirming Keynesian or classical postulates.

Literature Review

The topic under study is of so much importance that there exists a lot of research work from different perspectives. We have narrated some studies as follows.

Fisher (1993) concluded that growth reduces inflation due to which it curbs productivity and investment. He added that small fiscal deficits and low inflation rates are not mandatory for good growth even in the long run. likewise, high inflation is not consistent with continued economic growth. Less than two to three percent inflation and growth are positively related (Ghosh and Philps, 1998).

According to Bruno and Easterly (1998), there is a high ratio of the public who thinks that inflation is bad for the economy; the ratio is, however, higher than tangible evidence. Their findings confirm the observation of many others like Reynoso (1989), Renelt (1992). Bruno examined special cases of inflation and finds that during high inflation, growth falls relatively fast while it recovers slowly as inflation falls.

Research also suggests that the relationship between economic growth and inflation are largely affected by economies with extreme values (Dornbusch,1993; Dornbusch, Levine & Renelt, 1992; Levine & Zervos 1993).

Nell (2000) proposed the viability of single-digit inflation is beneficial whereas double figures have reducing effects on economic growth. For a normal life, access to goods and services is a necessity. Inflation rate is a macroeconomic phenomenon that has bearing on not only economic development but on all spheres of life (Bal, Dash, & Subhasish, 2016).

Malik and Chowdhury , 2001) found that There are long and short run relationship among economic growth and inflation for the economies of Sri lanka, Pakistan Bangladesh

and India. They find out that Inflation has positive relation to saving but negative relation to economic growth in the analyzed countries (Chaturvedi, 2009). They found that 9% inflation is reasonable and bearable for Pakistan While Hussain (2011) also concluded that up to 9% inflation is beneficial for Pakistan Economy.

Not only economic growth, but terms of trade have negative relation with inflation. Murshed (2018) found a non-linear, inverse, and u-shaped relation between inflation and terms of trade for Bangladesh from 1980-2014. A non-linear relationship was also found between inflation (Consumer price index (CPI)) and economic growth by Boujelbene (2021). The researcher used data from 1990 to 2020 while employing Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) tests. The study also used Johanson co-inetgration and Vector Error Correction model. The CPI had a threshold above which the relation is negative, but below that point, the effect is insignificant. For Pakisatn, Jibran et al., (2018) analyzed the effect of TOT on economic growth by taking time-series data from 1980-2013. They used ARDL. They concluded that in the long run, the relation between TOT and economic growth is negative. The same relation existed in the short run.

Omay et al., (2018) analyzed the relationship between inflation and growth empirically in a panel data estimation through a multiple- regime panel regression. The sample consisted of 10 southern African countries. They came to conclude about a significantly negative relationship between inflation and economic growth with a threshold level of 12 and 32% determined endogenously. In another instance (Aloui et al., 2018) study about Saudi Arabian economy from the perspective oil prices, exchange rate, inflation, and output growth rate. They used "Morlet wavelet method". They viewed that Saudi economy is prone to risks negatively effecting economic growth based on results. In another instance, (Bandura, 2022) sampled 23 sub-Saharan African countries and used their data for 1982-2016 in a non-dynamic threshold approach to study the effect of inflation on finance growth. The result gave a threshold of 31% above which the relationship of both the variables turns negative. Hence, high inflation effects financial growth negatively. They focus of research of (Mandeya & Ho, 2021) was assessing the link between inflation and inflation uncertainty in connection to growth in South Africa. They used ARDL using quarterly data from 1961 quarter 1 to 2019 quarter 2. Their result confirms the harmful effect of inflation on economy, both in short run and long run. However, in South Africa, inflation uncertainty exists in short run. In a recent attempt (Junejo et al., 2021) used data from 1990-2020 to assess the effect of inflation, tax revenue, and imports on Pakistan's economic growth. Imports and inflation were found negatively effecting the economy.

Hussain et al., (2019), showed that long-run relationship between inflation and economic growth makes it difficult for nation to exceed. Pakistan faces high inflation. A nonlinear negative relation between inflation and economic growth was found by (Karahan & Çolak, 2020) for Turkey for the data from 2003 to 2017. As mentioned by(Iqbal et al., 2022), the current CPI for the country was 11 % on year basis in April 2021. They researched money supply, OIL PRICES, GDP, and exchange rate and its effects on inflation in Pakistan. Data taken was related to 1989 to 2019. Bound test confirmed the existence of long-term relationship among all the variables. Financial development and real economy was the focus of a study by (Appiah-Otoo & Song, 2022) for Ghana using auto regressive distributive lag bounds while finding a negative effect of financial development. For Bostwana, (Mothuti & Phiri, 2018) while employing ARDL approach, found that an appreciated Pula-dollar exchange rate increases inflation but itdoesn't effect economic growth. They also found no significant relation between inflation and economic growth; both short-run and long-run.

Research Methodology

Theoretical Framework

Popular researches on secondary data has used ARDL in the majority of the cases. The data used for inflation and economic growth is not only secondary in nature, but time series as well. Recent research employed ARDL approach for inflation-growth nexus (Appiah-Otoo & Song, 2022; Karahan & Çolak, 2020; Mandeya & Ho, 2021; Mothuti & Phiri, 2018). Studies in Pakisatn also followed ARDL approach for the same purpose (Batool et al., 2022) and Jibran et al., (2018) for example. Since majority of research on the topic using time series data has followed ARDL approach, this research too uses ARDL for analysis.

Research Model

This study used the model specified as follows

$$Yt = f(inf) \quad (1)$$

$$Yt = \alpha + \beta 1 inft + \beta 2 D(inf - K) + \varepsilon t \quad (2)$$

Here

Y_t: refers to GDP Growth rate %(Annual) and it is the dependent variable

Inf refers to inflation rate %(Annual) is the independent variable

D is a Dummy variable and D = 1 if inflation rate > *K* and *D* = 0 if inflation rate ≤ *K*

" ε_t" is the random error

Estimation techniques

The study employed the Augment Dickey-Fullerler test of the unit root to check the stationary of the variables. The result showed that the Gross domestic product growth rate is stationary at the level. Inflation was not stationary at the level. Instead, it turns out to be

stationary at first difference. The results are given in table 1. It clearly shows that GDP is stationary at level while inflation is stationary at first difference.

Table 1

Augmented Dickey-Fuller Results (Unit root test)

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

Source: Authors' own calculation

Table 2 gives a detail of the descriptive statistics of the data. The first column is the values of descriptive statistics of GDP, and the second column is about inflation. The standard deviation of GDP is less compared to inflation and that is why the GDP data is stationary at level. The mean value of GDP is below 5 and we can say that the GDP remained low during this time while inflation remained high at an average of 8. The data was also normal as the Jarque-Bera value is insignificant.

Table 2. Descriptive Statistics

	GDP	**INFLATION**
Mean	4.486	8.079
Median	4.731	7.844
Maximum	7.705	20.286
Minimum	1.014	2.529
Std. Dev.	1.881	3.921
Skewness	-0.101	0.727
Kurtosis	2.257	3.777
Jarque-Bera	0.864	3.969
Probability	0.648	0.137
Sum	157.043	282.778
Sum Sq. Dev.	120.357	522.973
Observations	35	35

Source: Authors' own calculation

For checking the long-run relationship between GDP and inflation, we used Wald and F-bound tests with ARDL. The result of ARDL is shown in table 3, the Wald-test in table 4, and Bound test in table 5.

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 number 2.

According to ARDL model results, inflation has a negative significant impact on GDP. Table 3 indicates that an inflation coefficient of 0.16 means that a one percent increase in inflation brings a reduction in GDP growth by 0.16 percent. R^2 In the table shows that

independent variables collectively explain 26% variation in the dependent variable. The relationship is negative between inflation and growth as is obvious from the negative sign.

The value of Wald statistics (14.77) is higher than the upper and lower bound values. This identifies the presence of cointegration and hence the long-run relationship between inflation and economic growth. Table 5 indicates that the F-statistics value is 9.677 which is greater than the 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 on GDP growth. Our results confirms that inflation has not just negatively affecting the economy of Pakistan, it is also a long run phenomenon. It is evident that Keynesian school of thought is exhibited in the case of developing economy.

Table 3. ARDL Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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

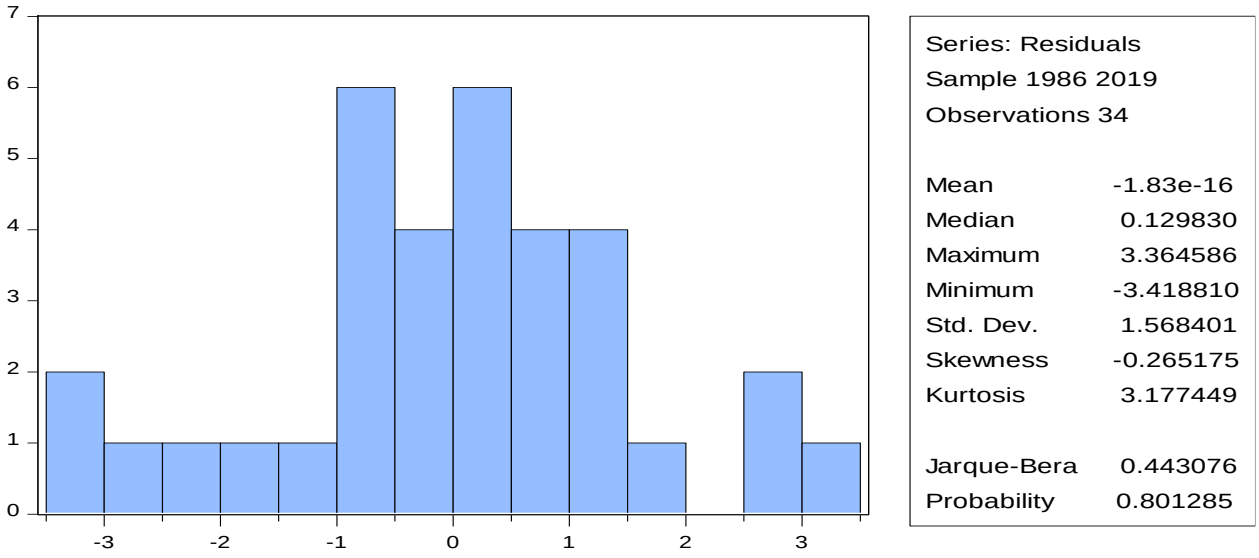
Table 4. Wald Test Results

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

Table: 5 F-Bound Test Results

Test Statistic	Value	k
F-statistic	7.088	1
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	3.015	3.49
5%	3.59	4.17
2.5%	4.19	4.80
1%	5.0	5.61

Table: 6 Histogram Normality test Results



Conclusion

This study aimed at finding (rechecking) the relationship between inflation and the growth of the economy of Pakistan. The data consisted of time series from 1985 to 2019. We had used all the necessary steps to arrive at our conclusion. The data was normal with less standard variation and ARDL test was applied for results as well as Wald and bound tests for other checks. After satisfaction form the results, we conclude an adverse effect of inflation on the growth of the economy. A 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. These results are the same as the results of (Ilyas et al., 2014) Ahmad and Mortaza (2005). They found a negative relationship between these two variables. So, this study proves that in Pakistan's scenario, the Inflation-growth nexus confirms Keynesian view.

Policy recommendations and Contributions of the Study

1. It is interesting to keep the inflation rate in a Single figure and the central bank adopts those policies that will help keep inflation above 4 and below 9 percent.
2. The determinant of inflation which has a Negative impact must be controlled to increase stability in the economy.
3. Higher inflation rate is very harmful to economic growth, so the government also controls the inflation rate.
4. 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.

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