

Impact of Inflation on Economic Growth: A Time Series Analysis

(A Time Series Analysis of Pakistan)

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Abstract:

This paper investigates the impact of inflation on economic growth for the period of 1973 to 2022 in Pakistan. This paper used ADF and PP unit root test, for checking the stationarity of data. The result of unit root test indicates that there is mix order of integration, therefore, this study used autoregressive distributed lag model (ARDL) to determine the co-integration among variables. The result shows that in long-run, inflation rate has negative and significant impact on economic growth for the period of 1973 to 2022, highlighting inimical effect of inflation on Pakistan economy. While specific impact of export and unemployment rate on economic growth has been included in this analysis, result shows export and unemployment have insignificant effect on economic growth. Moreover, the short-run result reveals that inflation rate has a negative and significant impact on economic growth. This shows that increase in inflation rate in Pakistan is detrimental to the economy both in the short-run and long-run period of time. On the basis of the descriptive and econometric analysis, it is recommended that the authorities and government should make more effective policies to target and maintain inflation rate at low to prevent its adverse effect which may incite economic growth.

“Keywords”

Inflation, Economic Growth, ARDL, Unemployment, Export, Unit root, Stationarity.

Introduction:

Sustainable economic growth with stable price is the primary objective of many countries in the world. It is debatable that inflation is good or harmful for any economy, but it is assumed that single digit inflation is beneficial for economic growth and high inflation is detrimental for economic growth. Although many researchers such as (Ayyoub, Chaudhry and Farooq 2011), (Adaramola and Dada 2020), (Karki, Banjara and Dumre 2020), (Madurapperuma 2016), (Mohseni and Jouzaryan 2016), and (Afzal, ARSHED and SARWAR 2013) have

found negative and significant impact of inflation on economic growth, they saw increase in inflation is inimical for the economy, but many of the research have found positive relationship between inflation and economic growth. for example, (Ijaz Uddin 2021), (Umaru and Zubairu 2012), (Raza, Javed and Naqvi 2013) and (Behera and Mishra 2007). Moreover, (Arby and Ali 2017), found that threshold inflation rate for Pakistan around 6 percent.

In 1970s countries faced high inflation due to sudden increase in oil prices, before 1970s it was assumed that only increase in money supply can increase inflation rate. (Bruno 1995) drew the picture of 1970s inflation crisis, he noted that many countries especially Latin America faced growth crisis due to high inflation. Many countries with repeated inflation such as Brazil, Somalia and Zaire the growth crisis exactly associate with inflation crisis. Besides, it was another evidence between the relation of Output and inflation from the dramatic output debacle in Eastern Europe and the Baltic countries, Russia and other countries of the Former Soviet Union(BRO) has happened synchronously with high rates of inflation in many countries. It had been discovered that those countries which had stabilized inflation, their economies recovered quickly and those countries who had not stabilized inflation, decreased their economies. This lucid scene could be seen from the successful Latin American stabilization in Argentina and Peru.

Likewise, World Data.info, depicted that GDP growth rate and inflation rate in India during 1971-1975 and 2015-2018. They indicated that inflation rate in India during 1971-1975 was, 3.08%, 6.01%, 16.94%, 28.60% and 5.575%, the economic growth rate for the same years were, 1.6%, -0.6%, 3.3%, 1.2%, and 9.1%. Same as, for the year 2015-2018, inflation rate was, 4.91%, 4.95%, 3.33%, and 3.94%, as a result of stable inflation rate the economic growth of India surged at the rate of 8%, 8.3%, 6.8%,6.5%.

Pakistan economy is experiencing one of the highest inflation rate in its 75 years of history. **Trading economics** has measured inflation rate in Pakistan in May, 2023 at 38%. Pakistan renowned economists **Dr. Hafiz, in his book titled: LEADING ISSUES IN THE ECONOMY OF PAKISTAN**, has showed that average decade wise inflation rate in Pakistan. In the 70s average inflation rate 13.1 %, and average inflation rate in the 80s was 6.7%. Also, the average inflation rate for the decade of 90s was 8.8, and the average inflation rate in 2000-2010 was 7.0%. Besides, the average inflation rate between 2010-2020 was 8.0%. In his book he discussed that Pakistan and Sri-lanka have generally had highest average rate of inflation among South-Asian countries for the period of 1990-2020. **From the given data by World Bank for annual GDP growth rate, we calculated the average Decade wise GDP growth rate in Pakistan for the period of 1970s to 2020s. The data showed that the average decade wise GDP growth rate in Pakistan for 1970s was equal to 5.163%, and for 1980s, it was equal to 6.69%. Besides, the average decade wise GDP growth rate in Pakistan for 1990s was, 3.899%, for 2000s it was 4.7%. Last but not least for 2010-2020 it was equal to 3.84%.**

Many economists have discussed different reasons for inflation in Pakistan, such as corruption, black market and foreign aids etc. but Dr. Hafiz in his book has highlighted many causes of inflation in Pakistan such as, Rate of Expansion in Money Supply, Rate of Increase in Import Prices, Rate of Depreciation of Exchange Rate, Rate of Increase in Administered Prices, and Rate of Change in Inflationary Expectations etc. **World Bank**, highlighted that the relationship between inflation rate and GDP growth rate for the 1971-1975 and 2015-2018 in Pakistan. According to them, the inflation rate in Pakistan for the year 1971-1975 were, 2.87%, 6.40%, 14.19%, 23.23% and 7.11% and economic growth rate for the same years were 0.62%, -1.80%, 3.84%, 2.46% and 4.2%. On the other hand, inflation rate seems stable during 2015-2018 i.e. 4.16%, 4.17%, 4.52%, 4.52% and 3.33% which result 7.34%, 7.68%, 6.53%, 6.33%.

The paper has been further divided into literature review, methodology, econometric model, result and discussion, conclusion and policy implication.

Objectives of Study:

- To investigate the impact of inflation on economic growth in Pakistan.
- To examine the relationship between inflation and economic growth in Pakistan.
- To state policy implication, keeping in view the statistical significance of the estimated results about inflation and economic-growth relationship and its effects on the economy of Pakistan.

Literature Review:

(Ijaz Uddin 2021) highlighted a strong and significant relationship between inflation rate and economic growth in Pakistan. He showed that one-unit increase in inflation rate cause GDP to increase by 0.27 unit. In contrary, (Ayyoub, Chaudhry and Farooq 2011) showed a negative and significant relationship between inflation and economic growth. Their study showed that inflation has detrimental effect on GDP of the economy of Pakistan after a threshold level. (KASIDI and MWAKANEMELA 2013) used time series data for the period of 1990-2011 to examine the impact of inflation on economic growth in Tanzania. The result showed that there was negative and significant relationship between inflation rate and economic growth in Tanzania in the short run, but they found that there was no any statistically significant long-run relationship between inflation and economic growth in Tanzania. (Shahid 2014) results depicted that inflation has negative insignificant impact on GDP but it highlighted a long run relationship between inflation and economic growth in Pakistan for the time period of 1980-2010. Furthermore, (Ramzan 2021) his result proved that the influence of inflation on the economic growth is insignificant for the period of 1980 to 2018 in Pakistan. (Adaramola and Dada 2020) Studied the negative and significant relationship between inflation and economic growth in Nigeria for the period of 1980-2018. (Gokal and Hanif 2004) Indicated a weak and negative correlation between inflation and economic growth in Fiji.

(Karki, Banjara and Dumre 2020)demonstrates that high inflation is baneful for the economic growth of Nepal, and he inculcates that low and stable inflation underpin sustainable economic growth for long period. Besides, he mentioned that the threshold value of inflation to be approximately 6 percent for Nepal. Moreover, (Madurapperuma 2016) examined the effect of inflation on economic growth in Sri-Lanka for the period of 1988-2015 by using the framework of Johanssen cointegration test and Error Correction Model. Their results showed that there is a long run negative and significant relationship between economic growth and inflation in Sri-Lanka. (Tien 2020)Investigates the threshold between inflation and GDP growth in Vietnam. The result confirms the presence of threshold at 6 per cent inflation point, and the negative impinge on GDP growth of hyperinflation above the threshold and too low inflation beyond the threshold. (Ndoricimpa 2017)Illustrated inflation threshold effects on economic growth in Africa. He first estimated inflation threshold effect for the whole sample and then for the two sub-samples of low income and middle income respectively. His findings suggested that an inflation threshold level of 6.7 per cent for the whole sample, also he estimated the inflation threshold for the low income and middle-income countries as 9 per cent and 6.5 percent respectively. The result depicted that for the whole sample and the sub-sample of low-income countries, low inflation does not impinge economic growth, but for the sub-sample of middle-income countries, inflation is growth enhancing in the low -inflation regime. However, result showed that inflation above the threshold is harmful to economic growth.

Furthermore, (Fakhri 2011)highlights a non-linear relationship between economic growth and inflation over the period of 2000-2009 in the Azerbaijan economy. He estimates a threshold level of inflation for GDP growth was 13 per cent. Below this threshold level inflation has statistically significant positive effect on GDP growth, but when inflation exceeds over 13 percent this positive relationship becomes negative. (NGOC 2020) purports that effect of inflation on economic growth are negative and asymmetric in the long-run in case of Vietnam. (Mohseni and Jouzaryan 2016) examined the role of inflation on economic growth for the period of 1996-2012 in Iran. The results showed negative and significant effect of inflation on economic growth in the long-run, which highlighted that inflation reduced economic growth in the long-run. (Hwang and Wu 2011) their findings show that the inflation threshold effect is highly significant and stalwart in China. Above the 2.50 per cent threshold, every 1 percent point surpass in the inflation rate impasse economic growth by 0.6 per cent. However, below this threshold, every 1 per cent point surpass in the inflation rate incites or instigate growth by 0.53 percent. This depicts that high inflation is detrimental for the economic growth and moderate inflation rate is beneficial for the economic growth. (Umaru and Zubairu 2012)his paper revealed that inflation possessed a positive impact on the economic growth via enhancing productivity and output level and on evolution of total factor productivity in case of Nigeria. In addition to, (Thanh 2015) has found a negative and significant impact of inflation on

economic growth for the inflation rate above the threshold level of 7.8 per cent for the ASEAN-5 countries.

Furthermore, (Bibi and Ahmad 2014) study shows that inflation has negatively related with the economic growth of Pakistan for the period of 1980-2011. In addition to, (Chughta and Aftab 2015) finds that inflation rate has a negative impact on Pakistan economic growth over the year 1981-2013. (chaudhary , Ayyob and Imran 2013) has suggested that a single digit inflation may panacea for the sectorial growth, however, a very low inflation is also deleterious for the growth of agriculture and service sector in Pakistan. Also, (Raza, Javed and Naqvi 2013) indicates that there exists a statistically positive and significant long run relationship between CPI and real GDP for a period of 1972 to 2011. (Mubarik 2005) estimated the threshold level of inflation in Pakistan using data set from 1973 to 2000. The result indicated that 9 per cent threshold level of inflation and above which inflation is baneful for economic growth. (Junejo, et al. 2021) analysed that inflation has significantly negative effect on the economic growth of Pakistan for the year 1990-2020. (Najid and Muhammad 2012) indicates that economic growth in Pakistan has negative relation with inflation. (Hussain, et al. 2019) analysed negative association between inflation and GDP , in the long run an increment in inflation hindrance the economic growth in case of Pakistan. On the other hand, (Attari and Javed 2013) shows that in the short run, the rate of inflation does not impinge economic growth.

(Pollin and Zhu 2006) presents new nonlinear regression estimates of the relationship between inflation and economic growth for 80 countries for the period of 1961 to 2000 by using middle- and poor-income countries. They firstly find that higher inflation is directly related with moderate gain in the GDP growth up to roughly 15-18 per cent threshold. However, their findings diverge when they consider countries on the basis of their income. (Afzal, ARSHED and SARWAR 2013) they analysed that food inflation has significant and negative relationship with economic growth both in the short and long run in case of Pakistan by using time series data for the period of 1971-1972 to 2010-2011. (Sarel 1996) Highlights that when inflation is toppling, it has no significant and negative effect on economic growth, and the effect can be lit bit positive. But when inflation is exorbitant then it has strong statistically significant and negative effect on economic growth. (Behera and Mishra 2007) the study confirms the existence of long-run equilibrium relationship between economic growth and inflation. He found that inflation has significantly positive relationship with economic growth by his long-run analysis of Indian economy.

Methodology and Data:

The data used in this study are time series data for the time period of 1973 to 2022. The data are taken from World Bank for the time period of 1973 to 2022. GDP is dependent variable in this model and inflation, export and unemployment -are taken as independent variable.

There are different researchers like (Ijaz Uddin 2021), (Ayyoub, Chaudhry and Farooq 2011), (KASIDI and MWAKANEMELA 2013), (Shahid 2014), (Ramzan 2021), (Adaramola and Dada 2020), (Gokal and Hanif 2004), (Karki, Banjara and Dumre 2020), (Madurapperuma 2016), (Ndoricimpa 2017), (Fakhri 2011), (NGOC 2020), (Bibi and Ahmad 2014), (Chughta and Aftab 2015), (Raza, Javed and Naqvi 2013), (Mubarik 2005), (Junejo, et al. 2021), (Behera and Mishra 2007) have shown the relationship between inflation and economic growth. Following the methodologies of (Ijaz Uddin 2021), (Ayyoub, Chaudhry and Farooq 2011), (Iqbal and Nawaz 2009) and (Najid and Muhammad 2012), (Stievany and Jalunggono 2022) **our model becomes,**

$$GDP_t = f(INF_t, Exp_t, Un_t)$$

Where,

INF = Inflation rate (CPI)

Exp= Exports of goods and services (% of GDP)

Un= Unemployment, total (% of total labour force)

GDP = GDP (constant 2015 US\$)

t = time period from 1973 to 2022

The main objection of this research is to investigate the effect of inflation on economic growth in case of Pakistan from 1990 to 2020. The data are taken from World Bank. This study used Economic growth as dependent variable and inflation and investment as explanatory variables.

Econometric Model:

$$GDP_t = \alpha_1 + \beta_1 INF_t + \beta_2 Exp_t + \beta_3 Un_t + \varepsilon_t$$

In time series data, it is important to check the stationarity of data because there is chance of presence of spurious regression. Therefore, to avoid from spurious regression, this study is using two types of unit root test i.e. Augmented Dicky fuller test (ADF) and Phillips Perron test(PP) for checking stationarity of time series data for the period of 1973-2022.

Augmented Dicky Fuller Test:

The ADF equation would be,

$$\Delta GDP_t = \alpha + \beta_1 * INF_t + \beta_2 * Exp_t + \beta_3 * Un_t + \gamma_1 * GDP_{t-1} + \gamma_2 * INF_{t-1} + \gamma_3 * Exp_{t-1} + \gamma_4 * Un_{t-1} + \varepsilon_t$$

Here,

ΔGDP_t : is the first difference of GDP at the time period t. $\beta_1, \beta_2, \beta_3$: represents the coefficients that shows the impinge of the current variables on Gross Domestic Product. And $\gamma_1, \gamma_2, \gamma_3, \gamma_4$: these coefficients show the impinge of lagged variables on GDP rate. $GDP_{t-1}, INF_{t-1}, Exp_{t-1}, Un_{t-1}$: lagged value of GDP, inflation, export and unemployment rate. And ε_t is the error term. Therefore, our null and alternative hypothesis of ADF unit root will be:

- $H_0: \gamma = 0$ series have unit root issue and non-stationary time series
- $H_a: \gamma < 0$ stationary time series.

The Phillips-Perron (PP) test:

The general equation of Phillips Perron is as,

$$\Delta Y_t = \alpha + \beta_t + \gamma Y_{t-1} + \sum \delta_i \Delta Y_{t-1} + \varepsilon_t$$

The above equation, ΔY_t : is the 1st difference of time series variable and $\sum \delta_i \Delta Y_{t-1}$: This measures the impact of past differences on current differences in the time series. Also, γY_{t-1} : is showing the coefficients of lagged level of time series variables. β_t : it captures trend in the time series variable and help in the prediction of stationarity and ε_t is the error term.

The PP test equation is determined using the current sample of n observations for the time period of 1973 to 2022. The β_t significance is determined to understand the availability of a trend in Y_t . The null hypothesis has been tested against and alternative hypothesis.

AUTOREGRESSIVE DISTRIBUTIVE LAG MODEL:

ARDL model is the fit the bill if a model have combination of variables with I(0) and I(1) order of integration. Before applying ARDL, we must check the co integration of variables. To check the co integration we need to check the F-statistics to compared with upper and lower level of critical bounds. If F-statistics is above the critical bound level, then the presence of co integration is proved, however, if it is lower than lower critical bounds then the presence of co integration cannot be accepted. Our samples showed mixed stationarity, therefore, we used ARDL model.

The null and alternative hypothesis of the ARDL bound test is as given,

If there is no co integration among variables then Null hypothesis will be,

$$H_0: B_1 = B_2 = B_3 = 0$$

If there is co integration among variable then the alternative hypothesis will be,

$$H_1: B_1 \neq B_2 \neq B_3 \neq 0$$

$$\begin{aligned} \Delta \ln GDP &= \alpha_0 + \sum_{h=1}^p w_h \Delta \ln GDP \\ &+ \sum_{j=0}^{p1} \beta_j \Delta \ln INF_{(t-1)} \\ &+ \sum_{k=0}^{p2} \beta_k \Delta \ln Exp_{t-1} + \sum_{i=0}^{p3} \beta_i \Delta \ln Un_{t-1} + \gamma_1 \ln GDP + \gamma_2 \ln INF + \gamma_3 \ln Exp \\ &+ \gamma_4 \ln Un + u_t \end{aligned}$$

Here, the dependent variable is $\ln GDP$, time is presented with t ; the lag of the dependent variable may be shown by $\ln GDP_{t-1}$. The 1st independent variable is shown as $\ln INF_t$ and 2nd independent variable is presented by $\ln Exp_t$ and 3rd $\ln Un_t$. Δ shows the rate of change.

For examining the short run relationship among the variables Vector Error Correction Model is used. Its equation is given as,

$$\begin{aligned} \Delta \ln GDP &= \alpha_0 + \sum_{h=1}^p w_h \Delta \ln GDP \\ &+ \sum_{j=0}^{p1} \beta_j \Delta \ln INF_{(t-1)} \\ &+ \sum_{k=0}^{p2} \beta_k \Delta \ln Exp_{t-1} + \sum_{i=0}^{p3} \beta_i \Delta \ln Un_{t-1} + \rho_1 ETC_{t-1} + u_t \end{aligned}$$

ETC_{t-1} is the Lagged Error Correction, where as ρ_1 is the speed of adjustment from short run to long run.

Result and Discussion

Descriptive Statistics:

Table 1.1 indicates the statistical decryptions of the available data set. It highlights that the average economic growth is 25.5477, the average inflation rate is 2.0878, the average increase in exports shows a decline i.e. -0.0107 and the average unemployment rate is -0.01446. Moreover, export and unemployment shows negative skewness, and Unemployment has leptokurtic. The value of Jarque-Bera value **0.3519** is showing the variables are normally distributed.

Table 1.1

	Mean	Max	Min	skewness	Kurtosis	SD	Observations
lnGDP	25.54773	26.5	24.337	.5357396	2.150769	.6619616	50
lnINF	2.087812	3.28	.92795	1.370464	2.6731	.5489106	50
lnExp	-.010170	1.08	-.2365	-.437391	2.290487	.0983345	50
lnUn	-.014446	.178	-2.497	-1.12819	3.382343	.4405639	50

Correlation matrix:

The correlation matrix in table 1.11 shows the correlation between variable's. It depicts that there is negative relationship between inflation rate, export growth rate and unemployment rate with economic growth rate.

Table 1.11

	LnGDP	lnINF	lnExp	lnUn
lnGDP	1.0000			
lnINF	-0.2090	1.0000		
LnExp	-0.0437	0.2260	1.0000	
lnUn	-0.0891	-0.0272	0.0545	1.0000

Unit Root Test:

table 1.2 shows Augmented Dickey-Fuller test and Phillips-Perron test for unit root. The result of the test depicts that GDP and Inflation are stationary at level but in case of export rate and Unemployment we fail to reject the null hypothesis at level. However, at first difference the result indicates that both export rate and unemployment are stationary i.e. at 1st difference. Here, (**) indicates the rejection of null hypothesis.

Table 1.2

Variables	ADF AT LEVEL	PP AT LEVEL
lnGDP	5.024**	5.147**
lnINF	-3.028**	-3.028**
LnExp	-1.387	-1.387
lnUn	-1.588	-1.588

Variable	ADF at first diff	PP at first diff
Lnexp	-5.984**	-5.984**
lnUn	-6.380**	-6.380**

VAR-Lag Order-selection criteria:

In VAR-Lag Order Selection Criteria, we will select LL, LR, FPE, AIC, HQIC and SBIC maximum lag length 5 for this study because maximum number of the criteria comes in optimal lag length as 5.

Table 1.3

Lags	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-6.3253	-	-	-	.000019	.491681	.55234	.657173
1	940.35	1893.4	16	0.000	1.1e-24	-43.8262	-43.5229	-42.9987
2	936.962	-6.7764	16	-	2.3e-24	-43.0934	-42.6081	-41.7695
3	-	-	16	-	-3.5e-24*	-	-	-
4	973.338	-	16	-	1.4e-24	-43.6827	-42.8335	-41.3659
5	1528.76	1110.8*	16	0.000	8.8e-36	-69.56*	-68.5288*	-66.7466*
6	-	-	16	-	-3.8e-35	-	-	-

ARDL Bound test

To check whether integration exists or not between data, bound test is used. Table 1.4 shows that the **F-statistics value i.e.6. 836**. If the F-statistics is greater than the upper critical bound then the null hypothesis i.e. there exists no co-integration would be rejected. Table 1.4 shows that the F-statistics value is greater than the upper critical bound, thus the null hypothesis has been rejected and it shows that there exists a cointegration between economic growth, inflation, export and unemployment rate.

TABLE 1.4

Test statistics	value	Critical Value bounds	
F- statistics	6.836		
Significance level		Lower Bound	Upper Bound
10%		3.17	4.14
5%		3.79	4.85
2.5%		4.41	5.52

Long-run Coefficient:

Table 1.5 illustrates the long-run ramification of this research. The result shows that there is significant and negative relationship between economic growth and inflation rate in Pakistan for the selected period of time. The result of this study is endorsed by the findings of (Ayyoub, Chaudhry and Farooq 2011), (Shahid 2014), (Adaramola and Dada 2020), (Madurapperuma 2016), (Bibi and Ahmad 2014), and (Hussain, et al. 2019). Our estimation

highlights that 1 percent increase in inflation rate reduces the economic growth by (0.690334) percent for the given time period (1973-2022).

Moreover, our findings demonstrate that there is positive relationship between growth in export rate and economic growth rate, but it is insignificant. In contrary, there is negative relationship between Unemployment rate and economic growth but it is again insignificant. **The constant coefficient in our study is .8039427, and it is strongly significant which means that there are some factors other than inflation, export and unemployment rate which contributes to the baseline level of economic growth. These factors may be tax revenue, FDI, technological process and government policies related to the imposition of taxes, policies related to doing business etc. It is mandatory to recognize the effect of inflation on economic growth should be taken with the significant constant, this helps understanding of the relationship between inflation and economic growth and spots the presence of other significance factors which impinge economic growth.**

Table 1.5

Variables	Dependent variables GDP			
	Co efficient	St. Error	T-statistics	Probability
lnINF	-.690334	.2960384	-2.33	0.028 ***
lnExp	3.736539	2.153413	1.74	0.728
lnUn	-.0598562	.1702576	-0.35	0.095
Constant	.8039427	.1672125	4.81	0.000***
@trend	-.000127	.000291	-0.44	0.665
R-Square	0.9991			
Adjusted R-Square	0.9989			
F-Statistic	4946.59			
Log Likelihood	97.063471			
Root MSE	0.0156			
Porb (F statistics)	0.0000			

Short-Run Coefficient:

The table 1.6 shows the short-run effect of independent variable on economic growth. Our result highlights that inflation has a negative and significant effect on the economy of Pakistan in the short as well. It shows that 1 percent increase in inflation in Pakistan can

affect the economy negatively by (0.258514). This result is in line with (KASIDI and MWAKANEMELA 2013) for short run effect of inflation on economic growth. Moreover, Unemployment has negative relationship with economic growth but it is statistically insignificant. Also, our result highlights negative relationship between growth of export rate with economic growth but it is again insignificant, therefore, it is not crucial to explain. **The constant having coefficient (.4831791) directs that when inflation rate, export growth rate and unemployment are zero, still there is positive value of economic growth. It means in the short run just like long-run, economic growth can also be affected by other factors as well such as government policies, investment, and tax rate etc.**

Table: 1.6

Variables	Dependent variable			
	Co efficient	St. Error	t-statistics	Prob
lnINF	-.0258514	.0079719	-3.24	0.003***
lnUn	-.0024388	.0038419	-0.63	0.531
LnExp	-.0055	.0292449	-0.19	0.852
Constant	.4831791	.1197396	4.04	0.000***

Diagnostic test:

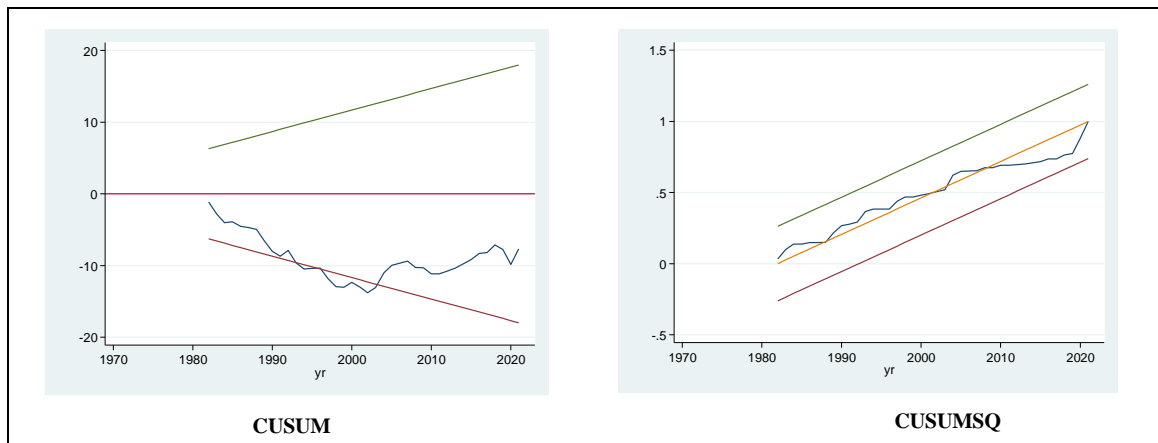
The table 1.7 indicates the diagnostics test. In the we used different types of tests such as Breusch-Pagan, Ramsey reset Test, Jarque-Bera normality test, and Breusch-Godfrey LM test for autocorrelation to check heteroscedasticity, serial correlation, auto-correlation and normal distribution. The result of these test indicates that there is no issue of heteroscedasticity, autocorrelation, serial correction and normal distribution in our data.

Table 1.7

Breusch-Pagan	P-value	Chi2(1)	Breusch-Godfrey LM test for autocorrelation	Prob	chi2
		0.579		0.28	
Ramsey reset Test	p-value	F (3, 41)		0.2708	2.613
		0.3949	1.02		
Jarque-Bera normality test:	P-value	chi2(2)		Stable	
		0.3519	2.09		

Table 1.8 shows CUSUM and CUSUMSQ test, these tests are used to check the stability of short run and long-run coefficients of our model. The result highlights that CUSUMSQ remains within critical range and don't exaggerate the critical range which shows the stability of the model.

Table 1.8



Conclusion:

This paper aims to investigate the impact of inflation on economic growth for the period of 1973 to 2022. This paper used ADF and PP unit root test, for checking the stationarity of data. The result of the unit root test indicates that there is mixed order of integration i.e. GDP growth and inflation rate shows stationary at level, but export and unemployment rate shows stationarity at first difference, therefore, this study used autoregressive distributed lag model (ARDL) to determine the co-integration among variables. The result shows that in the long, inflation rate has negative and significant impact on economic growth for the period of 1973 to 2022, highlighting inimical effect of inflation on Pakistan economy. While specific impact of export and unemployment rate on economic growth has been included in this analysis, result shows export has positive effect on economic growth and unemployment has negative effect on economic growth, but their effects are statistically insignificant. Moreover, the short-run result reveals that inflation rate has negative and significant effect on the economic growth. This showed that increase in inflation rate in Pakistan is detrimental for the economy of Pakistan both in the short-run and long-run period of time.

This study found out that inflation has detrimental effect on the economic growth in Pakistan. These finding have crucial policy implication for policy makers, implying that controlling inflation is an important condition to bolster economic growth. Therefore, policy makers should concentrate to keep inflation rate at single digit. This study concluded that all factors which cause inflation i.e. cost-push, demand pull, increase in money supply, and exchange rate flexibility etc. should be addressed with fit the bill policies so as to buttress economic growth.

[International Monetary Fund](#), measured inflation rate in Pakistan as 27.4 in 2023. The renowned Pakistani economists **Dr. Hafiz A. Pasha** has discussed the causes of inflation in Pakistan for the period of 1990-2022 in his book titled: [LEADING ISSUES IN THE ECONOMY OF PAKISTAN](#). He mentioned following factors which contributed inflation in Pakistan such as **Rate of expansion in Money supply, Rate of Increase in Import Prices (in \$), Rate of Depreciation of Exchange Rate, Rate of Increase in Administered Prices, Rate of Change in Inflationary Expectations etc.** Hence to attain a sustainable economic growth, policy makers in Pakistan should strive to keep inflation rate by controlling these factors with sustainable policies so that inflation rate may hold at single digit rate.

Conflict of Interest: The author has no conflict of interest

Ethical Approval: To ensure the ethical integrity of my study, I will seek ethical approval from the relevant authorities or any other appropriate regulatory body, as required

References:

- Chughta, Muhammad Waqas, and Rashid Aftab. 2015. "Impact of Major Economic Variables on Economic Growth of Pakistan." *Acta Universitatis Danubius*. 94-106.
- Fakhri, Hasanov . 2011. "Relationship between Inflation and Economic Growth in Azerbaijani Economy: Is There Any Threshold Effect?" *Asian Journal of Business and Management Sciences* 1 (1): 1-11.
- Gokal, Vikesh, and Subrina Hanif . 2004. "RELATIONSHIP BETWEEN INFLATION AND ECONOMIC GROWTH." *Reserve Bank of Fiji*.
- Hwang, Jen -Te, and Ming -Jia Wu. 2011. "Inflation and Economic Growth in China: An Empirical Analysis."
- Iqbal, Nasir , and Saima Nawaz. 2009. "Investment, Inflation and Economic Growth Nexus." : *Pakistan Institute of Development Economics, Islamabad* 863-874.
- Karki, Seema , Sushma Banjara, and Amrit Dumre. 2020. "A review on impact of inflation on economic growth in Nepal." *Archives of Agriculture and Environmental Science* 5 (4): 576-582.
- Madurapperuma, M. W. 2016. "Impact of Inflation on Economic Growth in Sri Lanka." *Journal of World Economic Research* 5 (1): 1-7.
- Mohseni , Mehrnoosh , and Feizolah Jouzaryan. 2016. "Examining the Effects of Inflation and Unemployment on Economic Growth in Iran (1996-2012)." *Procedia Economics and Finance* 30: 381-389.
- Ndoricimpa, Arcade . 2017. "Threshold Effects of Inflation on Economic Growth: Is Africa Different?" *International Economic Journal* 31 (4): 599-620.

- NGOC, Bui Hoang . 2020. "The Asymmetric Effect of Inflation on Economic Growth in Vietnam: Evidence by Nonlinear ARDL Approach." *Journal of Asian Finance, Economics and Business* 7 (2): 143-149.
- Pollin, Robert , and Andong Zhu. 2006. "Inflation and Economic Growth: A Cross-Country Nonlinear Analysis." *Journal of Post Keynesian Economics* 28 (4): 593-614.
- Raza, Syed Hassan, Muhammad Rashid Javed, and Syed Muddassir Abbas Naqvi . 2013. "Economic Growth And Inflation: A Time Series analysis of Pakistan." *International Journal of Innovative, Rearch and Development* 2 (6).
- Adaramola, Olugbenga Anthony , and Oluwabunmi Dada. 2020. "IMPACT OF INFLATION ON ECONOMIC GROWTH : EVIDENCE FROM NIGERIA." *Investment Management and financial Innovations* 17 (2).
- Afzal, Muhammad , MUHAMMAD GULFAM ARSHED, and KAFEEL SARWAR. 2013. "EDUCATION, HEALTH, FOOD INFLATION AND ECONOMIC GROWTH IN PAKISTAN." *Pakistan Economic and Social Review* 51 (2): 109-138.
- Arby, Muhammad Frooq , and Amjad Ali. 2017. "Thresholf inflation in pakistan." *SBP RESEARCH BULLETIN* 13.
- Attari, Muhammad Irfan Javaid , and Attiya Y. Javed . 2013. "Inflation, Economic Growth and Government Expenditure of Pakistan: 1980-2010." *Procedia Economics and Finance* 5: 58-67.
- Ayyoub, Muhammad , Imran Sharif Chaudhry, and Fatima Farooq. 2011. "Does Inflation Affect Economic Growth? The case of Pakistan." *Pakistan Journal of Social Science* 31 (1): 51-64.
- Behera, Jaganath , and Alok Kumar Mishra. 2007. "The Recent Inflation Crisis and Long-run Economic Growth in India: An Empirical Survey of Threshold Level of Inflation." *South Asian Journal of Macroeconomics and Public Finance*.
- Bibi, Sadia, and Syed Tauqeer Ahmad. 2014. "Impact of Trade Openness, FDI, Exchange Rate and Influence on Economic Growth: A case study of Paksitan." *International Journal of Accounting and Financial Reporting* 4 (2): 2162-3082.
- Bruno, Michael . 1995. "Does inflation really lower Growth?" *International Monetary Fund*.
- chaudhary , Imran shareef , Muhammad Ayyob, and Fatima Imran. 2013. "DOES INFLATION MATTER FOR SECTORAL GROWTH IN PAKISTAN? An Empirical Analysis." *Pakistan Economic and Social Review* 51 (1): 71-92.
- Hussain, Sadam , Waqar Ahmad, Yasmeen Qamar, and Muhammad Shahid Akram. 2019. "Impact of Inflation, CO2 Emissions and Foreign Investment on Economic Growth: A Case of Pakistan." *Asian Development Policy Review*. 7 (4): 307–317.
- Ijaz Uddin. 2021. "Impact of inflation on economic growth in Pakistan." *economic consultant* 33-41.

- Junejo, Dr. Ikramuddin, Muhammad Faiz, Neha Qazi, and Awais Ahmed Khan Tipu. 2021. "Impact of Inflation, Imports and Tax Revenue On Economic Growth of Pakistan: An Empirical Study from 1990-2020." *International Research Journal of Management and Social Sciences* 2 (2).
- KASIDI, Faraji , and Kenani MWAKANEMELA. 2013. "IMPACT OF INFLATION ON ECONOMIC GROWTH: A CASE STUDY OF TANZANIA." *Asian Journal of Empirical Research* 3 (4).
- Mubarik, Yasir Ali . 2005. "Inflation and Growth: An Estimate of the Threshold level of inflation in Pakistan." *SBP-Research Bulletin* 1 (1).
- Najid, Ahmad , and Luqman Muhammad. 2012. "A dynamic analysis of the relationship among inflation, investment, population growth, export and economic growth in Pakistan." *Asian Journal of Research in Bussiness Economics and Management* 2 (8): 175-182.
- Ramzan, Muhammad . 2021. "Impact of Inflation and Unemployment on Economic Growth of Pakistan." *RESEARCHARTICLEEuropean Journal of Business and Management Research* 6 (4).
- Sarel, Michael . 1996. "Nonlinear Effects of Inflation on Economic Growth." *Palgrave Macmillan Journals on behalf of the International Monetary Fund* 43 (1): 199-215.
- Shahid, Muhammad . 2014. "Effect of Inflation and Unemployment on Economic Growth in Pakistan." *Journal of Economics and Sustainable Development* 5 (15): 2222-1700.
- Thanh, Su Dinh . 2015. "Threshold effects of inflation on growth in the ASEAN-5 countries: A Panel Smooth Transition Regression approach." *Journal of Economics, Finance and Administrative Science* 20 (38): 41-48.
- Tien, Nguyen Hoang . 2020. "Relationship between inflation and economic growth in Vietnam." *Turkish Journal of Computer and Mathematics Education* 12 (14): 5134- 5139.
- Umaru, Aminu , and Anono Abdulrahman Zubairu. 2012. "Effect of Inflation on the Growth and Development of the Nigerian Economy (An Empirical Analysis)." *International Journal of Business and Social Science* 3 (10).