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Between the Devil and Deep Sea: Evaluating the Impact of Climate Shocks on Inflation and Economic Growth in Pakistan

Wajid Islam[1], Aleena Khan[2], Nudrat Fatima[3]

1. Khyber Pakhtunkhwa Technical Education and Vocational Training Authority; (wajidislam01@gmail.com).
2. Department of Economics at NUML, Islamabad Campus;
Management Studies Department, Bahria Business School, Bahria University, Islamabad; al3enakhan@gmail.com
3. Management Studies Department, Bahria Business School, Bahria University, Islamabad, Pakistan; nudratfatima91@gmail.com

***Corresponding Author; Nudrat Fatima[3]**

Email; nudratfatima91@gmail.com

Abstract

This study assesses the impact of climate shocks on inflation and GDP growth, based on1976-2022 data for Pakistan. For this purpose, ADF and P-P unit-root tests are applied to find integrating order. The ARDL bound approach confirmed the long-run relationship among inflation, economic growth, Climate shock along with the other variables. The findings suggest that climate shocks lead to inflation. Likewise, the relation of economic growth and climate shock show an inverse relation, signifying the importance of this debate in Pakistan. If the country wants a stable economy with tamed inflation and high economic growth, the country needs to adopt and bring resilience to the climate related shocks. On the mitigation front the country cannot do much, however, some prudent steps can save the country from the repeated climate related shocks.

Keywords: Climate Change, Inflation, economic Growth, Cointegration

1. Introduction

The world economy, particularly the developing countries, faces an existential threat from unprecedented climate change. Countries in the Global South bear the brunt of carbon emissions from the Global North, resulting in severe natural disasters. Despite Pakistan contribution of only 0.8% of total greenhouse gas (GHG) emissions, it remains a prime target of climate change (Lin and Ahmad 2017). Currently, Pakistan is facing a very high inflation and low economic growth.

Since 1880, the average global temperature has risen by 1.1 degrees Celsius. This increase has intensified the severity and frequency of climate-related shocks. Projections indicate that temperatures could rise by an additional 4 degrees Celsius, further exacerbating the situation (IPCC 2007 & 2014). The economic and financial losses caused by the temperature increase will be felt worldwide, with severity varying based on the vulnerability, composition, and size of economies. Weak institutions, inadequate infrastructure, limited adaptability, and fragile economies in developing countries have rendered them more susceptible to the impacts of climate change.

For instance, Pakistan continuously faces the brunt of climate change. The gravity of the problem becomes evident from the calamities endured by the country last year due to climate change. Firstly, Pakistan witnessed severe droughts brought about by an unprecedented heatwave, with temperatures soaring above 50°C in the summer. Subsequently, record-level monsoon flash floods occurred. Every few years, Pakistan witnesses significant losses due to floods, such as in 2010 when the country lost 2.4 million hectares of unharvested crops, valued at approximately $5.1 billion (ADB, 2021). The recent floods in 2022 directly affected more than 33 million people, resulting in 1,730 fatalities and the displacement of 8 million individuals. Additionally, over one million heads of livestock were lost, and approximately 2 million houses were either destroyed or damaged. Critical infrastructure, including dams and roads, was washed away, while 22,000 schools were forced to close due to damage. The country incurred $30 billion in damages and losses and requires an additional $16.3 billion for reconstruction and rehabilitation (UNDP, 2022). These floods also pushed an additional 9 million people below the poverty line in the country (World Bank, 2022).

Alongside floods, Pakistan also contends with severe heatwaves and droughts. The country ranks as the 8th most vulnerable nation to the climate crisis on the Global Climate Risk Index, facing constant drought risk. In 2019 alone, over 3 million people were affected by droughts in Sindh province, and 1.8 million were impacted in Baluchistan. Between 1999 and 2002, droughts in the same provinces claimed the lives of over two million livestock, necessitating emergency relief to provide drinking water and food aid to farming communities. The extended drought period from 2015 to 2017 in the worst-affected districts of the country reduced livestock output by 48%.

Climate change also exerts a detrimental effect on Pakistan's agriculture sector, which serves as the backbone of its economy. This sector employs 37.4% of the workforce and contributes a 22.9% share to the country's economy (Pakistan Economic Survey, 2022-23). However, crops prove highly sensitive to temperature and water availability, as suggested by Dehlavi et al. (2015). Water stress alone could reduce GDP by 4.6% by 2047 through agricultural losses. Drought stress has already impacted 30% of Pakistan's agricultural land, leading to food insecurity and jeopardizing the livelihoods of millions. It has also diminished livestock productivity (Algur et al., 2021). Approximately 70% of Pakistan's exports consist of agricultural products (PEC, 2023-24), which are significantly affected by climate change, exacerbating the trade deficit (Khan et al., 2019).

Moreover, the rise in temperatures leads to a 10% drop in labor force productivity during peak months, as found by Dunne et al. (2013). This decrease coincides with the period when major crops such as rice and wheat are produced in Pakistan, exacerbating the issue of food insecurity. The labor force not only loses employment opportunities due to extreme climate shocks but also must allocate their scarce resources to address disease outbreaks resulting from floods and heatwaves, pushing them into a vicious cycle of poverty (Babar, M. S., et al., 2021). Developing countries, particularly Pakistan, are the most affected and vulnerable to climate change consequences (Conway et al., 2015). Multiple natural disasters further deteriorate Pakistan's already low Human Development Index (HDI), which ranks 164 out of 192 countries. Mani et al. (2018) suggests that climate shocks will exacerbate living standards across the entire country, increasing undernourishment, deprivation, and poverty.

Another consequence of climate change is the increased demand for electricity and air conditioning, necessitating further borrowing by Pakistan and adding stress to its already depleted foreign reserves. On average, a one-degree increase in temperature leads to a 0.5-8.5% increase in electricity demand (Santamouris et al., 2015). The country's circular debt has reached Rs2.63 trillion, approximately $10 billion. With 1/3 of its energy produced from fossil fuels and a growing trend in this direction, Pakistan becomes vulnerable to global energy price shocks, leading to inflation and reduced exports. Additionally, the increasing import of fossil fuels exacerbates the trade deficit (Malik et al., 2019).

Every year, Pakistan incurs substantial financial losses due to climate change. GermanWatch (2017) estimated annual losses of $3.8 billion. Recent estimations (WB & ADB 2021) suggest that each year, 1.5 million people and $5.8 billion of the country's GDP are affected by climate change. The Country Climate and Development Report (CCDR, 2022) has estimated climate change losses in Pakistan under various scenarios. In the optimistic scenario, the country could face a real GDP loss of 6 to 7% by 2050 due to climate-related changes. Conversely, in pessimistic scenarios, losses could reach up to 9% of GDP annually by 2050. Without timely intervention to address the combined effects of climate change intensification risks and environmental degradation, these losses could escalate to 18 to 20 percent per year by 2050 (CCDR, 2022).

The climate crisis compounds Pakistan's economic challenges at a time when its ballooning external debt and liabilities, totaling around US$125 billion, are already a cause for concern (SBP, 2023). The government requires at least USD 41 billion to fund imports and repay debt in 2023. Over the next five years, Pakistan owes the world USD 25 billion in principal repayments annually. An additional USD 10 billion is needed to finance the current account deficit, bringing total external financing needs to USD 35 billion annually between now and 2027. The State Bank of Pakistan (SBP) reported that, as of June 2023, the country holds only $4.46 billion in reserves. Furthermore, Pakistan must repay $77.5 billion in external debt between April 2023 and June 2026 (United States Institute of Peace, 2023). The country's currency is among the worst-performing in the region, even trailing behind debt-defaulted Sri Lanka. According to (Islam, et.al, 2023) the country debt has become unsustainable. An inflation rate of 36.4% further burdens the lives of its citizens. Pakistan teeters on the brink of default, with credit rating agencies such as Moody's, Fitch, and S&P ranking it as Caa3, CCC-, and CCC+, respectively.

Given these challenges, this study will try to assess that how climate change is impacting inflation and economic growth in Pakistan.

1.1 Objective of the Study

The primary objective of this paper is to empirically assess the impact of between climate related shocks on inflation and economic growth in Pakistan. This study will utilize data spanning from 1976 to 2022. This will be the first study of its kind within Pakistan, focusing on evaluating the influence of climate change on the country's inflation and economic growth.

1.2 Organization of this study

Section 1 of this paper has provided a brief introduction and objectives. Section 2 has shed some light on the available literature. Section 3 discusses the data overview and empirical strategy for carrying out the estimation. Section 4 will provide results and discussion. The last section will provide a conclusion.

2. Literature Review

Climate change has become one of the biggest issues of the 21st century and a global threat (Urry 2015). Some available literature has provided a base about the financial and economic impacts caused by the changing climate. Boneva et al., (2022) in their study highlighted the need to evaluate the impact of climate change on inflation, as neglecting this important issue poses severe difficulty to the policy makers to develop sound policies. Iliyasu et al., (2023) assessed the impact of climate change on inflation and economic growth for the largest African economies using SVAR model. The study found that climate change shocks increase inflation and reduces economic growth. Li et al., (2023) studied the impact of climate change on inflation for 26 countries. The study found a non-linear relation of climate change and inflation. Similarly, Odongo, et al., (2022) evaluated the impact of climate change risks on inflation for the 10 Eastern and southern African countries. The study found that the country in the sample which are more vulnerable to climate shocks face high inflation. Almajali, (2023) estimated the impact of climate disturbances on inflation and economic growth for various countries. The result of the study suggest that the impact of climate change on inflation and growth varies from country to country depending on the development and fiscal resilience of the country.

Regarding the impact f climate change on economic development the studies of Nordhaus (2006), and Dell et al. (2012) evaluated that the developing countries have witnessed a significant decline in their economic growth due to higher temperatures. Another study, carried out by Burke et al. (2015) evaluated that the countries located in hotter climate geographies bear greater damages due to an increase in temperature. Acevedo et al. (2018), Kahn et al. (2019) and Burke & Tanutama (2019) revealed that economic growth nonlinearly responds to the temperature and the macroeconomic impacts caused by weather anomalies are different across the countries. Likewise, it is documented that economic development is adversely affected by natural disasters caused by climate change. (Skidmore and Toya 2002; Rasmussen 2004 Loyaza et al., 2012; Raddatz 2009 and Noy 2009;), deteriorate the trade balance of countries (Gassebner et al. 2010).

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Regarding Pakistan, there is some literature available on the impacts of climate change on economic growth (Akram and Hamid, 2015 and khan et al. 2016). Some other studies have also evaluated the influence of climate change on the agriculture sector of the country like; Janjua, et al. (2011); Shakoor (2011) and Siddiqui et.al. (2012), Ali et al. (2017) and Khan et al. (2020). However, there is no study available on the relationship of climate change on inflation and economic growth collectively.

This study will properly evaluate the impact of repeating climate disturbances on inflation and economic growth based on the historic data.

3. DATA AND METHODOLOGY

3.1 Data

This study used the time series data from 1976 to 2022 for Pakistan. The key explanatory variables of our interest are climate shocks caused by the weather related disastrous. The data for such shocks is collected by the Emergency Events Database (EM-DAT) from the 1900 to till date. The data is categorized because of different events like floods, extreme temperatures, droughts, and storms. Following the summarized literature in Botzen et al. (2019), we introduce some control variables in our analysis, like, trade openness, money supply growth, terms-of-trade index, broad money growth, public debt to GDP as a proxy for fiscal constraint, financial openness index developed by Chinn and Ito (2006).

The overall variables used in the study are inflation, economic growth, GDP per capita, public debt to GDP, broad money growth, term of trade index, financial openness. Data are obtained from the World Bank database, World Development Indicators (WDI), Pakistan Economic Survey and State Bank of Pakistan. Table 1 provides the descriptive summary statistics of all the variables.

Table 1: Descriptive Summary Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max	Skewness	kurtosis
Inflation	47	8.450696	4.0268	2.529328	21.3	0.0047	0.0300
Real GDP growth	47	4.80094	2.1578	-1.2740	10.215	0.55	0.30
GDP per Capital	47	1114.254	285.17	665.752	1695.9	0.26	0.18
Broad Money Growth	47	15.51	6.90	4.31	42.90	0.0002	0.0008
Public Debt to GDP	47	71.06436	9.8802	52.1215	89	0.85	0.0009
Urban Population	47	32.5214	3.1436	26.681	37.731	0.64	0.0068
Term Of Trade	47	63.97227	12.971	42.3032	91.325	0.21	0.08
Financial Openness	47	.1594806	.02376		.16294	0.00	000

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Output Gap	47	.0000118	2825.2	-11782.1	8199	0.008	0.0001
Climate Shock	47	1916343	3765655	0	2.04e+07	0000	0000

Source: Author's calculation

The value of skewness and kurtosis in the table show the variables normality. Variables are considered normal when the skewness value falls in the range of ±10 and the kurtosis value between ±3 (Jushan & Serena, 2005).

3.2 Modeling and variable justification

The key purpose of this study is to assess the Impact of climate shocks on inflation and GDP growth. Furthermore, to evaluate the vulnerabilities of developing countries like Pakistan to the climate related shocks. The study used time series data from 1976 to 2022.

Inflation and GDP growth are the dependent variable, while public debt to GDP, broad money growth, term of trade index, financial openness developed by Chinn and Ito (2006) and climate shocks are the independent variables. The functional relationship of the study is given as:

$$Inflation = f(public\ debt, BMG, TOT, Finincial\ openness, Climate\ shock) \quad (1)$$

For this study the basic time-series econometric model as follows:

$$(Inflation)_t = \alpha_0 + \alpha_1 \left({PD}/{GDP}\right)_t + \alpha_2 BMG_t + \alpha_3 TOT_t + + \alpha_4 Fin_{Op_t} + + \alpha_5 Climate\_s_t + \varepsilon_t \quad (2)$$

The variables are transformed into their natural logs due to the time series data sharpness and giving unreliable and inefficient empirical results for developing economies (Karagol, 2006). Similar log-linear specification gives unbiased and efficient evidence (Sezgin, 2004). Taking the aforementioned discussion into consideration the model will be as follow:

$$l(Inflation)_t = \alpha_0 + \alpha_1 l({PD}/{GDP})_t + \alpha_2 lBMG_t + \alpha_3 lTOT_t + + \alpha_4 lFin\_Op_t + + \alpha_5 lClimate\_s_t + \varepsilon_t \quad (3)$$

The equation (3) is converted into equation (4) for the estimation of long-run ARDL model.

$$l(Inflation)_t = \alpha_0 + \alpha_1 l(Inflation)_{t-i} + \alpha_2 l({PD}/{GDP})_{t-i} + \alpha_3 lBMG_{t-i} + \alpha_4 lTOT_{t-i} + \alpha_5 lFin\_Op_{t-i} + \alpha_6 lClimate\_s_{t-i} + \varepsilon_t \quad (4)$$

To estimate the long-run relationship of the variables, the following model will be used;

$$(Inflation)_t = \alpha_0 + \alpha_1 l(Inflation)_{t-i} + \alpha_2 l({}^{PD}/_{GDP})_{t-i} + \alpha_3 lBMG_{t-i} + \alpha_4 lTOT_{t-i} + \alpha_5 lFin\_Op_{t-i} + \alpha_6 lClimate\_s_{t-i} + \omega EC_{t-1} + \varepsilon_t \quad (5)$$

Where;

$l(Inflation)_t$ = log of inflation

$l({}^{PD}/_{GDP})_t$ = log of public debt to GDP

$lBMG$ = log of broad money growth

$lTOT_t$ = log of term of trade index

$lFin\_Op_t$ = log of financial openness

$lClimate\_s_t$ = log of Climate shocks, including floods, drought, extreme temperature and strms

ε_t = error term

Similar equations will also be used to find the impact of climate shocks on economic growth.

3.3 Methodological Framework

Unit-root testing is the first requirement for choosing an appropriate model in the time series data. When the stationarity of variables is confirmed then the next step is the selection of optimal lag length based on various criteria. Then co-integration tests are conducted and if there is long-run relation then further ARDL error-corrected version regression is estimated.

To find the order of integration, this study will use the Augmented Dickey-Fuller test. For robustness, the Phillips Peron test will also be conducted. If the integration order is different that is I (0) and I(1) then ARDL will be used.

Pesaran et al. (2001) developed this approach known as the autoregressive distributive lag (ARLD), to test co-integration. This study has used this approach. There are several reasons for using the aforesaid approach as highlighted by Emran et al. (2007), that this approach has many advantages over the other conventional co-integration test, as shown by the Monte Carlo evidence. This approach corrects the possible problem of endogeneity of the dependent variables and the estimate shows the required small sample properties. Another major advantage of this approach is it can be used for the series integrated of order I (1) or I (0) or I(0)/ I(1), regardless of the pre unit root testing and thus avoid the uncertainties. Another bonus point is that it can be applied to a small sample size (Narayan, 2005). Moreover, both the long-run and short-run relationships can be assessed by it simultaneously. The model is given as:

$$(Inflation)_t = \alpha + \sum_{i=1}^{p} \varphi_i \, (Inflation)_{t-i} + \sum_{i=1}^{q_1} \omega_i (^{PD}/_{GDP})_{t-i} + \sum_{i=1}^{q_2} \lambda_i BMG_{t-i} + \sum_{i=1}^{q_3} \theta_i TOT_{t-i} + \sum_{i=1}^{q4} \Omega_i \, Fin\_Op_{t-i} + \sum_{i=1}^{q_5} \mu_i \, Climate\_s_{t-i} + \omega EC_{t-1} + \varepsilon_t \quad (7)$$

The time trend and drift component is indicated by α. The εt denotes the error term, while p, q_1, q_2, q_3, q_4 and q_5 denotes the lags order which is obtained through the Akaike information criterion, to make ensure that there is no serial correlation.

Pesaran et al. (2001) presented the upper critical bound and the lower critical bound to evaluate the long-run relation between the variables. The null hypothesis is there is no co-integration, H_0 : αEd/GDP = ωME/GDP = λGDP = θHDI = 0, while the alternative hypothesis is H_1 : αEd/GDP ≠ ωME/GDP ≠ λGDP ≠ θHDI ≠ 0. After finding the F statistics value, it will be compared with the UCB and LCB given by Pesaran et al. (2001). If the obtained value is higher than the upper critical bound, then it indicates the presence of long-run relationship among the variables and vice versa. After finding the long-run relationship an ECM model will be developed.

4. RESULTS AND DISCUSSION

As discussed previously, the Pesaran et al. (2001) bound approach will be used for the co-integration test. According to (Ang, 2007), when there is some variable integrated at I (2) then the statistics provided by Pesaran et al. (2001) and Narayan (2005) are not applicable. That is why it is a pre-requisite to make the series stationary at level or at first difference. Table 4 shows the unit root estimations of all the variables through ADF and PP tests. It is clear from the table that external debt, military expenditure and HDI are not stationary at level at both ADF and PP tests, however, all these variables become stationary at the first level as shown by their p-values in the table. GDP is stationary at level. So at I(1) our three variables are integrated and one at I(0).

Table 2: Unit Root Estimation

	Augmented Dickey Fuller (ADF)				**Phillip Peron (PP)**				
Variables	At level		At 1st difference		At level		At 1st difference		
	t stat	P value	t stat	P value	t stat	P value	t stat	P value	Stationary
L.Inf	-2.40	0.37	-4.93	0.0003	-2.57	0.29	-5.95	0.00	I(1)
L.PD	-1.813	0.69	-4.622	0.000	-1.519	0.82	-5.12	0.00	I(1)
L.GDP	-3.492	0.04			-4.728	0.00			I(0)
L.BMG	-5.071	0.00			-5.311	0.00			I(0)
L.TOT	-1.665	0.76	-5.937	0.000	-1.614	0.78	-6.886	0.00	I(1)
Fin Op	-4.689	0.000			-6.706	0.00			I(0)

L. Clim_D	-4.935	0.000			-6.383	0.00			I(0)

Source: Author's calculation

To measure the impact of dependent variables on the independent the optimal lag length criteria holds a very important position (Nkoro, E. 2016). For annual frequency time series, a maximum of 2-4 lags may be considered. Four criteria are used to obtain the optimal lags that are: FPE, AIC, HQIC and SBIC as shown in Table 5. In our data, all the criteria are significant at the first lag.

Table 3. Optimal lag. Selection-order criteria selection. Sample: 1971–2021.

Lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-19.6864				1.8e-07	1.51096	1.60282	1.78032
1	78.2726	195.92	36	0.000	4.9e-09	-2.13368	-1.49067	-.248179
2	122.642	88.73	36	0.000	3.7e-09	-2.62601	-1.43185	.875639
3	179.206	113.13	36	0.053	2.1e-09	-3.83567	-2.09036	1.28213
4	273.427	188.44*	36	0.028	3.3e-10*	-7.26043*	-4.96396*	-.526482*

Note: Significant at * $p < 0.10$
Source: Author's calculation

After establishing the order of integration and obtaining the optimal lags by SIC criteria, we will now move towards the ARDL bounds testing approach because of the mixed order of integration. Pesaran, Shin, & Smith (2001) developed this technique to find variables long-run relationship. The null hypothesis shows the absence of a long-run relationship, while the alternative hypothesis implies the presence of a long-run relationship. Hassler and Wolters (2006) recommended that if the f-value of test statistics is greater than the f-value of the upper bound then there is the existence of a long-run relationship, and the null hypothesis will be discarded. The critical f-value and test statistics are estimated at a different level that is at 1%, 2.5%, 5% and 10%. Table 5 provides the ARDL bound test values.

Table 4. ARDL bound test Values for Co-integration

Critical F-Values K = 3		
CL	LB	UB
1%	2.26	3.35
2.5%	2.62	3.79
5%	2.96	4.18
10%	3.41	4.68
F-test statistic = 5.40		

Source: Author's calculation

From the above table, one can see that the f-test statistics is 5.40, which is far greater than the upper bound of critical f-value at 1%, 2.5%, 5% and 10%, which means that is rejected and there is long-run co-integration among all the variables.

After finding the long-run relation through the bound test the error correction ARDL regression is estimated. Table 5 shows the long-run and short-run relationship of the independent variables with that of the dependent variable.

Table 5. ARDL Model 1 regression estimates.

	D.lnInf	**Coef.**	**Std. Err.**	**t**	**P>|t|**
Adjustment	lnInfL1.	-0.500	.153	-3.25	0.003
	lnPD	1.178131	2.0316	0.58	0.567
Long-Run	lnBMG	.1735405	.5770899	0.30	0.766
	lnTOT	.4458571	1.312335	0.34	0.737
	lnClim_D	5.1600	3.1700	1.63	0.115
	lnFin_Op	24.08568	12.41304	1.94	0.064
Short-Run	lnInf D1.	.0924381	.1646334	0.56	0.579
	lnPD D1.	-.7598614	1.424656	-0.53	0.598
	lnBMG D1.	-.4165991	.1916761	-2.17	0.039
	lnFin_Op	-7.243136	2.639527	-2.74	0.011
	Constant	-4.634257	2.607927	-1.78	0.088

Observations 41
R-squared 0.61
Root MSE 0.31

Source: Author's calculation

The empirical value of the long run in the table illustrates that there is a positive relation between of climate shocks and inflation for the climate vulnerable Pakistan. The result shows that a 1% increase in climate shocks brings a 5.1% surge in inflation. This result confirms that climate shocks is one of the key causes of augmenting inflation In Pakistan. Similarly, the public debt to gdp, a proxy of fiscal space is also showing positive relation in the long run with inflation for Pakistan, highlighting that with more debt the inflation of the country will further deteriorate. Likewise, the relation of terms of trade index is also positive, because the country is relying on imports while having not many exports, triggering inflation in the country.

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Table 6. ARDL Model 2 regression estimates.

	D.lnInf	Coef.	Std. Err.	t	P>|t|
Adjustment	lnGDP L1.	-.9948944	. 0750933	-13.42	0.000
	lnClim_D	-7.99	7.59	-1.05	0.299
Long-Run	lnFin_Op	.4255639	1.302844	0.33	0.746
Short-Run	lnGDP_c D1.	23.94793	1.652519	14.49	0.00
	Constant	-.7598614	1.424656	-0.53	0.598
			Observations 43		
			R-squared 0.91		
			Root MSE **0.17**		

Source: Author's calculation

The above table suggests that climate shocks have inverses relation with the GDP growth in Pakistan. The country's economic growth is adversely affected by the repeated climate related calamities.

Our long-run model clears all the diagnostic tests, shown in Table 8 for heteroscedasticity, serial correlation and normality of the error terms.

Table 7. ARDL Diagnostic Tests

Tests	Criterion	Test-Statistic
Breusch-pagan	Prob > Chi-square	0.57
Durbin-Watson	d-statistic (16, 39)	2.082365
Normality Testing	Prob (Skewness)	0.1911
	Prob (Kurtosis)	0.2009

Source: Author's calculation

5. Conclusion and Recommendations

The debate of climate change and its macroeconomic impacts holds a very important position for developing countries like Pakistan, because they are the most vulnerable to these shocks and have

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no financial resources to absorb such shocks. The paucity of resources pushes the country to incur both financial and human losses every year. The current study is an effort to assess the impact of climate shocks on inflation and GDP growth. Time series data from 1976 to 2022 is used for this study. After conducting the stationarity tests and finding optimal lags, the study used the bound test of co-integration, which confirmed a long-run relation among the external debt, GDP growth and HDI.

The empirical results suggest that inflation is positively related to climate shocks, which implies that climate shocks lead to inflation in Pakistan. Likewise, the relation of economic growth is negative with climate related shocks, which means that an increase in climate disasters will lead to the decline in economic growth.

If the country wants to tame the burgeoning inflation and depleting GDP, the country needs to take immediate steps to mitigate and adopt the ever-rising climate related calamities. The country needs to work on climate resilience because it is now the 5^{th} most vulnerable country to climate change. The country needs to implement a climate emergency to mitigate the impacts of climate related macroeconomic shocks. The policymakers also need to convince the developed countries to help the county because the country is bearing the brunt of some undone sins, as the country total contribution to climate change in the form of carbon emission is less than 1 percent which it is bearing very huge cost.

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Data Availability: The data for analysis for the current study is collected from the World Bank database, World Development Indicators (WDI), Pakistan Economic Survey and State Bank of Pakistan.

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