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"The Three Evils": Inflation, Poverty and Unemployment's Shadow on Economic Progress—A Novel Exploration from the Asymmetric Technique

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Abstract: The primary goal of this analysis was to determine the impact of inflation, poverty, unemployment, and population growth on economic growth in Pakistan using time series data from 1986 to 2020. The stationarity for the variables was tested through unit root testing, while the asymmetric (NARDL) technique was applied to expose the association amid the variables via short-run and long-run dynamics. The outcomes show that (1) variable inflation and poverty have adversative linkages to economic growth, (2) unemployment has a positive association with economic growth, and (3) variable population growth showed a negative association via short-run and long-run dynamics. Inflation, poverty and unemployment are now emerging issues in the Pakistan. The Pakistani economy has been determined to have a strong and negative link between inflation and economic growth. After a certain point, generalized inflation seems to be harmful to economic growth in the country. New governmental strategies and policies are required to tackle this issue in order to boost economic progress.

Keywords: inflation; economic growth; unemployment; income distribution; poverty headcount; NARDL

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1. Introduction

Policymakers and experts have been worried about unemployment and inflation, especially in developing countries. In the macroeconomic environment, employment and inflation are two of the most important indicators and variables for economic progress and development. Changes in the money supply are often blamed for inflation. The price of many goods rises as the amount of money in circulation increases. Inflation is defined as a rise in prices. There is a natural unemployment rate, often known as the equilibrium level of unemployment in a certain economy, according to classical economics. Inflation is the term used to indicate a rise in prices in an economy over time. Cost-pull inflation and demand-pull inflation are two types of economic inflation [1,2]. When the whole demand for products and services in the economy exceeds the total supply, demand and response inflation arises. This is referred to as cost-pull inflation, and it happens when the price of basic resources such as oil rises dramatically. Inflation and unemployment are different macroeconomic indicators that have substantial impacts on economic development [3]. Almost every country in the world has a problem with unemployment. This is a problem that almost every nation, wealthy or poor, needs to deal with on a daily basis. Unemployment is defined as the condition of not having a job or being unemployed, or the fraction of the population that is both able to work and actively seeking work but is unable to do so for whatever reason. Other prominent reasons for unemployment in emerging countries include technological development, the involvement of women in the labor force,

demography, income status, and migration from rural to urban regions owing to a rising demand for power production [4,5].

Economic growth has received a lot of attention in recent decades. Economic development has also been extensively researched in connection with inflation and unemployment, as these economic characteristics are especially prominent in emerging economies. In order to make effective economic decisions, one must understand the economic concepts of inflation and unemployment. Inflation may have an impact on a country's economic growth, employment, investment, income and wealth distribution, and even social and political conditions [6–8]. Inflation, on the other hand, refers to increasing prices for goods and services. Various economies throughout the world have experienced inflation at some time. The decisive considerations may have been when, why, how long, and the broader economic situation. It is reasonable to say that prices are rising in all economies, developed and emerging. Volatility may be the only thing going on in certain economies, while a steady increase in prices may be the only thing going on in others. Despite the overall increase in costs, the economies of certain countries have thrived. Inflation has a beneficial influence on these countries [9–11].

Inflation and unemployment are two of the most significant issues confronting many countries today. These factors have an influence on a variety of economic activities, including savings, investment, exports, poverty reduction, and growth. Inflation, for example, will have a negative impact on social wellbeing. Low inflation, on the other hand, is likely to result in lower economic growth rates, a larger proclivity for poverty, lower employment, and a sluggish economic decline. Unpredictable price rises in products and services signify inflation [12]. This situation will surely have an effect on society's falling purchasing power. To put it another way, a country's inflation has a significant impact. However, if it is not managed properly, it may have an impact on the economy. By addressing these difficulties, a country's government policies attempt to decrease unemployment, stabilize prices, and boost economic development. Depending on what the government chooses, fiscal and monetary policies may be utilized in tandem. Because of the conceptual trade-off between inflation and unemployment, achieving both goals is challenging [13,14]. Poverty is another significant hindrance to achieving a high standard of living, and it may be found in practically every region on the planet. Unavoidable unemployment is one of the main causes of poverty; therefore, a rise in the unemployment rate should result in an increase in poverty. Poverty levels inevitably rise as unemployment rises. Some nations have identified a positive correlation between poverty and unemployment. This paper makes a novel addition to the current literature on inflation, poverty, unemployment, and economic growth in Pakistan, and yet no study has been undertaken to highlight this rising concern. All of the study variables were verified for the stationarity using yearly data, and two unit root tests were employed to confirm this. The positive and negative shocks of decomposed variables with economic growth were checked using a Nonlinear Autoregressive Distributed Lag (NARDL) model with the estimation of short-run and long-run dynamics.

Aside from the introduction section, the remainder of the paper is arranged as follows: Section 2 explores previously published research on the key theme. Section 3 deals with study methodology and data, as well as a model demonstration (Section 3.1). Section 4 delves into the study's empirical findings and discussion. Finally, in Section 5, the study is summarized with a conclusion and policy recommendations.

2. Literature Review

Unemployment is a critical problem in global economic progress. It has happened in both developed and emerging economies in recent years, despite the fact that unemployment in wealthy countries has reduced considerably. In emerging economies, unemployment is growing fast, resulting in reduced family incomes and worse living standards, which contribute to a rise in the frequency and severity of poverty [15]. A lack of economic opportunity is seen to increase the level of poverty for individuals or families, which is a major impediment to economic progress. This lack of social mobility is exacerbated by

racial and economic inequality. Experts believe that measures targeted at closing gaps and ensuring that the disadvantaged in certain groups are economically secure may be combat poverty and inequality [16]. Poverty is often associated with a lack of financial resources to meet one's day-to-day needs. Poverty is described as a lack of means of subsistence, which includes being unable to afford the most basic requirements of life, such as food and shelter. In terms of money, a person's basic needs are viewed as a financial measure, and the poverty line is a word used to define the value of a person's basic needs. A person is deemed poor if their income falls below the federal poverty line. Several factors influence the quantity of poverty in a given location. Many studies on economic growth, inflation, and open unemployment have been undertaken. These factors have an important influence in establishing a country's poverty level. Inequality, underemployment, and inflation are all horrible global events that have various levels of impact on people of all ages, stages, and socioeconomic backgrounds. In general, economic growth is the most significant necessity for poverty reduction, followed by poverty reduction economic growth. GDP (Gross Domestic Product) growth isn't enough to eliminate poverty, but it is a necessary evil. Strong economic progress does not result in fewer people living in poverty in the absence of income equality [17–19].

Lack of income is a key socially determined factor in poor health, and it is a major consequence of unemployment in the labour market. The assumption that poverty, loss of income, or economic stress is a mediator between unemployment and health is supported by social epidemiology investigations. Poverty has a number of physical and psychological repercussions on one's health and wellbeing. The long-term consequences of unemployment on poverty and individual health have been studied extensively for decades. According to the evidence, those who are unemployed are more likely to suffer poverty and material deprivation as a result of the loss of income and job-related benefits [20–22]. In terms of externalities, the government is a fundamental response to the free-rider conundrum. Public goods and services are provided, common resources are managed, and knowledge externalities are developed by means of tax-funded educational, extension, and training efforts. However, democratic society can achieve some of these aims more successfully than the government. The effectiveness of public expenditure is improved when citizens band together and take action. There are substantial ramifications from the connection between public money and the capacity of civil society organizations to operate together. According to certain people, higher economic growth will help reduce poverty via social capital. Poor individuals have lower opportunity costs in terms of time, material assets, and financial resources. Due of the time-consuming nature of social relationships, the poor may decide to prioritize social capital. Increasing trust, decreasing opportunism, and developing knowledge externalizes may all contribute to economic development and poverty reduction [23,24].

Basic necessities such as adequate health care, enough education, and sufficient earnings make life more difficult for many individuals. The status of the economy influences the prices of products and services. Price fluctuations have a significant influence on people who are currently unemployed or underemployed, as well as those who are employed full-time. Economic growth rates have an impact on employment as well. For instance, it may be difficult to offer employment for individuals joining the workforce if the economy expands too slowly. Some full-time workers may find themselves working part-time or far below their capabilities as a consequence of the growth in the number of jobless people in the economy. There will be a clear correlation between long-term unemployment and the incidence of poverty. Discrimination in job practices has made it difficult for some people to move beyond the poverty line. In order to advance in one's job and earn more money, one must now have the ability to get by without a proper education level. These characteristics increase the chances that persons with less education would be jobless, work fewer hours per year, and earn less [25–28]. Poverty alleviation may be achieved via a variety of means, one of which is financial growth. Financial progress seems to have a

significant and irrefutable influence on poverty alleviation. Economic growth has a greater influence on poverty reduction when it is accompanied by financial development [29,30].

Economic concepts such as unemployment and inflation are among the most complicated concepts in the world of finance. The question of how growing and falling unemployment, inflation, and poverty are linked has occupied the minds of economists for many years. To be clear, the government's macroeconomic goals include growth, price stability, and full employment. These goals are pursued in order to improve conditions for everyone. Significant unemployment and unstable pricing have resulted in a substantial variability in growth rates [31]. The extent to which such monetary policy causes inflation is critical. According to the International Monetary Fund (IMF), the recent rise in global inflation is due to a number of factors. To begin with, the global pandemic has disrupted the supply chain, possibly resulting in inflationary supply shocks. Government-imposed shutdowns and the subsequent financial relief packages are producing artificial excess demand, which is matched with constrained supply, resulting in another inflation trigger. Another possible source of the excess money supply is central bank-induced government bond purchases. As of yet, the financing cycle for banks has not begun. There is a lot of uncertainty in the market concerning inflation forecasts because of these issues together. Inflation may be predicted using a variety of mathematical models that take into account changes in the economy [32,33].

In any economy, inflation and unemployment are significant challenges. In principle, all policymakers want low inflation and low unemployment. Other things being equal, it is commonly considered that a country's macroeconomic stability would be assured by single-digit inflation and unemployment of some percentage. Because macroeconomic stability is critical to growth, planning, and development, changes in other economic fundamentals must be monitored if stability goals are to be met. Inflation is an average measure of the total price level, as prices may grow, fall, or stay constant at any one moment; a continuous rise in prices affects the economy, particularly the poor, who have little or no reserves to offset price spikes. The average person in every home or family knows when his money can only buy a smaller number of items and services than before [34,35]. One of the most important development goals for both developing and developed countries is to reduce poverty. Over the last several decades, many politicians, particularly in developing nations, have made headway towards this aim by boosting economic development, instituting redistributive policies, or both. However, poverty results vary greatly between nations, depending on the unique effectiveness of their development policies [36].

3. Study Methodology and Data

This investigation's major aim was to determine the impact of inflation, poverty, unemployment, and population growth on economic growth in Pakistan by using annual datasets which were taken from the World Bank website for the years 1986 to 2020. The details of the study variables are as follows: economic growth (annual %), inflation (annual %), poverty (% of the population), unemployment (% of the total labor force), and population growth (annual %). Figure 1 depicts the year-to-year data trends for each variable.

Figure 2 presents the study's methodological road map, which explains that first, we conducted an investigation into the stationarity of the variables using two unit root tests, namely the Augmented Dickey Fuller test and the Phillips and Perron test, along with an exploration of the lag-length criteria for the variables. Following that, this investigation used bounds testing for the purpose of confirming the presence of cointegration. In addition to that, Johansen cointegration testing was utilized for the purpose of further examining the robustness among the variables. In the end, the Non-linear Autoregressive Distributed Lag approach was used in order to examine the influence that inflation, unemployment, population growth, and employment growth have on economic growth via the estimation of the long-run and short-run dynamics.

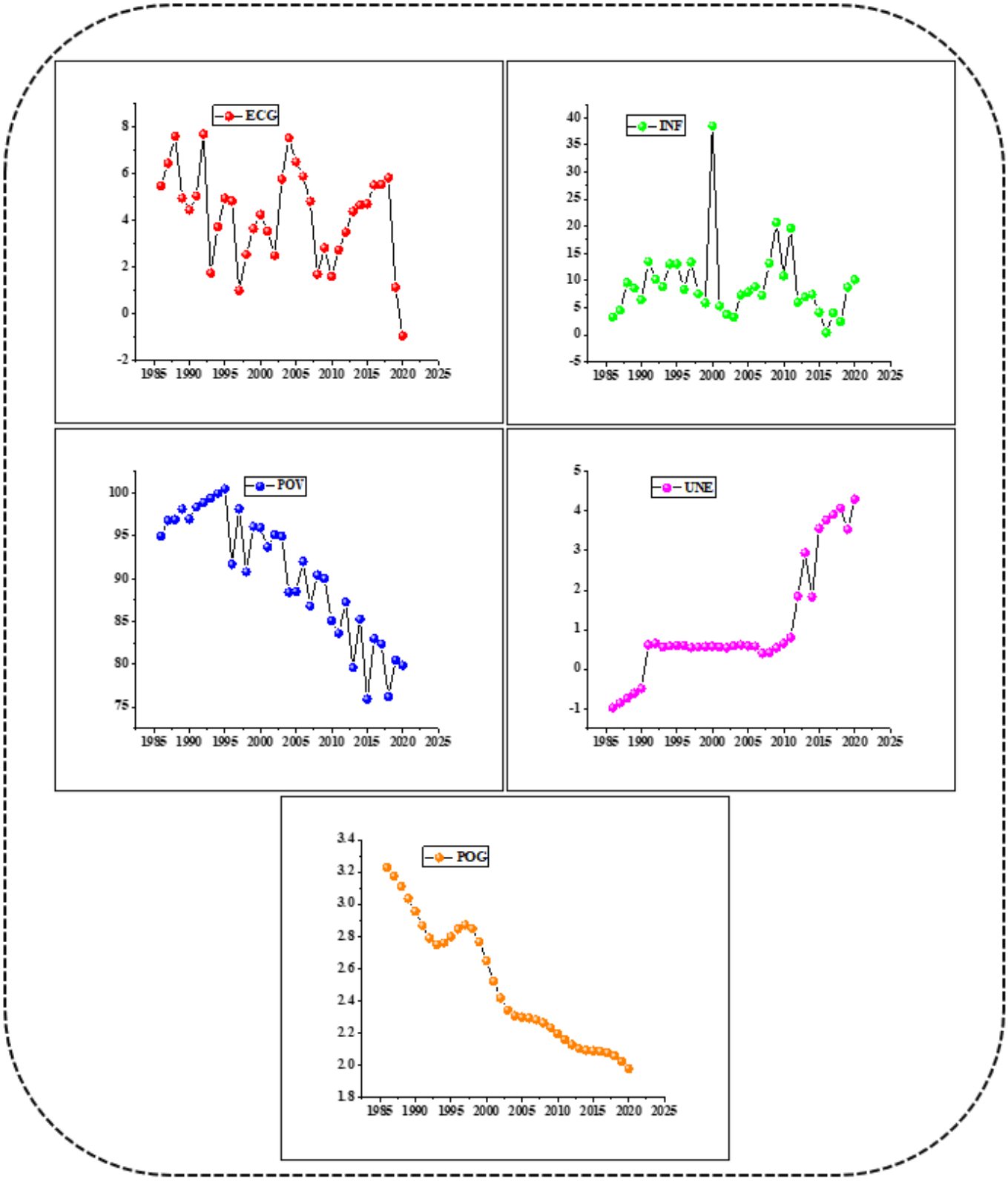

Figure 1. Year-wise trend of the study variables.

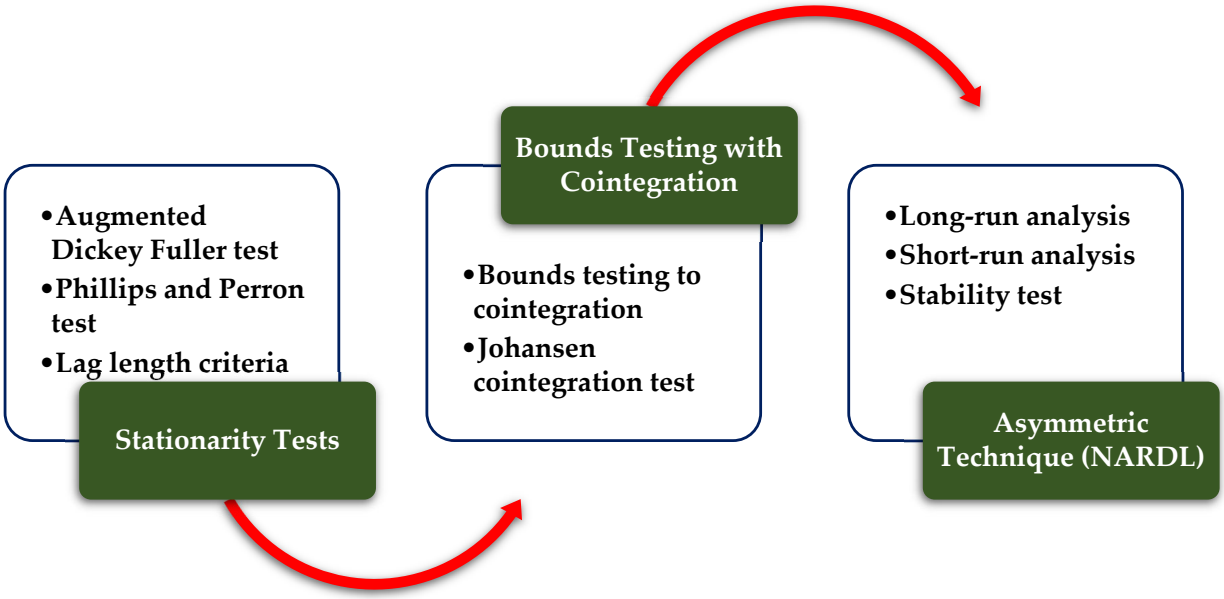

Figure 2. Study methodological map.

3.1. Study Model

Various investigations have been conducted by using different econometric techniques to encounter the linkages among the variables. Saidi et al. (2018) [37] utilized cointegration and panel unit-root tests to uncover the nexus amid variables by taking time sequence data. Grabara et al. (2021) [38] used the co-integration and Granger causality techniques to check the nexus among the different variables. Further, Su et al. (2021) [39] applied the dynamic panel system–generalized moment technique to encounter the relation amid variables. Similarly, Rehman et al. (2022) [40] used the symmetric (ARDL) approach with Fully Modified Least Squares and Dynamic Least Squares techniques to investigate the influence on variables. In this investigation, we have utilized the asymmetric (NARDL) technique to uncover the association among variables with short-run and long-run estimations. For the examination of the connection between economic growth, inflation, poverty, unemployment, and population growth, the following model can be stated as follows:

$$ECG_t = f(INF_t, POV_t, UNE_t, POG_t) \quad (1)$$

For more consistency, Equation (1) can be written as follows:

$$ECG_t = \theta_0 + \theta_1 INF_t + \theta_2 POV_t + \theta_3 UNE_t + \theta_4 POG_t + \varepsilon_t \quad (2)$$

In Equation (2), ECG_t = economic growth; INF_t = inflation; POV_t = poverty; UNE_t = unemployment; POG_t = population growth. The coefficients of the model are θ_1–θ_4, and t demonstrates the time extent. The ARDL (Autoregressive Distributed Lag) technique which was first developed by Pesaran et al. (2001) [41] was exploited in this investigation to check the linkage amid the variables, and can be expressed as follows:

$$\Delta ECG_t = \xi_0 + \sum_{f=1}^{1} \theta_f \Delta ECG_{t-f} + \sum_{f=0}^{1} \eta_f \Delta INF_{t-f} + \sum_{f=0}^{1} \varphi_f \Delta POV_{t-f} + \sum_{f=0}^{1} \gamma_f \Delta UNE_{t-f} + \sum_{f=0}^{1} \tau_f \Delta POG_{t-f} + \vartheta_1 ECG_{t-1} + \vartheta_2 INF_{t-1} + \vartheta_3 POV_{t-1} + \vartheta_4 UNE_{t-1} + \vartheta_5 POG_{t-1} + \varepsilon_t \quad (3)$$

The link between the variables is seen in the above Equation (3). It is more suited than other standard helpful procedures for the discovery of certain important factors in small samples because of its incentive effect on respondents. Shin et al. (2014) [42] assumed a longer-term perspective in order to use the F-test for long-term prediction verification. As immediately as cointegration is established, the long-term elasticity can

be calculated by ϑ_2–ϑ_5 and then regularized by ϑ_1. When decomposable variables such as inflation, poverty, unemployment and population growth are decomposed into positive and negative shocks (INF^+_q; POV^+_q; UNE^+_q ; POG^+_q), (INF^-_q; POV^-_q; UNE^-_q ; POG^-_q), an asymmetric approach can be created, which may be represented as follows:

$$POS(INF_t) = INF^+_q = \sum_{q=1}^{q} \Delta INF^+_q = \sum_{q=1}^{q} \max\left(\Delta INF^+_q, 0\right) \quad (4)$$

$$NEG(INF_t) = INF^-_q = \sum_{q=1}^{q} \Delta INF^-_q = \sum_{q=1}^{q} \min\left(\Delta INF^-_q, 0\right) \quad (5)$$

$$POS(POV_t) = POV^+_q = \sum_{q=1}^{q} \Delta POV^+_q = \sum_{q=1}^{q} \max\left(\Delta POV^+_q, 0\right) \quad (6)$$

$$NEG(POV_t) = POV^-_q = \sum_{q=1}^{q} \Delta POV^-_q = \sum_{q=1}^{q} \min\left(\Delta POV^-_q, 0\right) \quad (7)$$

$$POS(UNE_t) = UNE^+_q = \sum_{q=1}^{q} \Delta UNE^+_q = \sum_{q=1}^{q} \max\left(\Delta UNE^+_q, 0\right) \quad (8)$$

$$NEG(UNE_t) = UNE^-_q = \sum_{q=1}^{q} \Delta UNE^-_q = \sum_{q=1}^{q} \min\left(\Delta UNE^-_q, 0\right) \quad (9)$$

$$POS(POG_t) = POG^+_q = \sum_{q=1}^{q} \Delta POG^+_q = \sum_{q=1}^{q} \max\left(\Delta POG^+_q, 0\right) \quad (10)$$

$$NEG(POG_t) = POG^-_q = \sum_{q=1}^{q} \Delta POG^-_q = \sum_{q=1}^{q} \min\left(\Delta POG^-_q, 0\right) \quad (11)$$

Equations (4)–(11) give information on the effects of both positive and negative shocks on variables. As a result, the model's asymmetric representation may be summarized as follows:

$$\begin{aligned}\Delta ECG_t = {} & \beta_0 + \sum_{a=1}^{X} \theta_a \Delta ECG_{t-a} + \sum_{a=0}^{X} \tau_a \Delta INF^+_{t-a} + \sum_{a=0}^{X} \omega_a \Delta INF^-_{t-a} + \sum_{a=0}^{X} \alpha_a \Delta POV^+_{t-a} + \sum_{a=0}^{X} \varphi_a \Delta POV^-_{t-a} \\ & + \sum_{a=0}^{X} \psi_a \Delta UNE^+_{t-a} + \sum_{a=0}^{X} \gamma_a \Delta UNE^-_{t-a} + \sum_{a=0}^{X} \vartheta_a \Delta POG^+_{t-a} + \sum_{a=0}^{X} \rho_a \Delta POG^-_{t-a} + \eta_1 ECG_{t-1} \\ & + \eta_2 INF^+_{t-1} + \eta_3 INF^-_{t-1} + \eta_4 POV^+_{t-1} + \eta_5 POV^-_{t-1} + \eta_6 UNE^+_{t-1} + \eta_7 UNE^-_{t-1} \\ & + \eta_8 POG^+_{t-1} + \eta_9 POG^-_{t-1} + \varepsilon_t\end{aligned} \quad (12)$$

Equation (12) explores the asymmetrical representation for the variables. The exploration of the error correction model can be stated as follows:

$$\begin{aligned}\Delta ECG_t = {} & \beta_0 + \sum_{a=1}^{X} \theta_a \Delta ECG_{t-a} + \sum_{a=0}^{X} \tau_a \Delta INF^+_{t-a} + \sum_{a=0}^{X} \omega_a \Delta INF^-_{t-a} + \sum_{a=0}^{X} \alpha_a \Delta POV^+_{t-a} + \sum_{a=0}^{X} \varphi_a \Delta POV^-_{t-a} \\ & + \sum_{a=0}^{X} \psi_a \Delta UNE^+_{t-a} + \sum_{a=0}^{X} \gamma_a \Delta UNE^-_{t-a} + \sum_{a=0}^{X} \vartheta_a \Delta POG^+_{t-a} + \sum_{a=0}^{X} \rho_a \Delta POG^-_{t-a} + \eta_1 ECG_{t-1} + \eta_2 INF^+_{t-1} \\ & + \eta_3 INF^-_{t-1} + \eta_4 POV^+_{t-1} + \eta_5 POV^-_{t-1} + \eta_6 UNE^+_{t-1} + \eta_7 UNE^-_{t-1} \\ & + \eta_8 POG^+_{t-1} + \eta_9 POG^-_{t-1} + \varphi ECM_{t-1} + \varepsilon_t\end{aligned} \quad (13)$$

Equation (13) describes the exploration of the error correction models.

4. Empirical Findings and Discussion

4.1. Summary and Correlations Technique

The consequence of the summary statistics and correlations can be seen in Tables 1 and 2. Furthermore, it was discovered that all of the variables were identical. Based on the statistical significance of the Jarque–Bera statistic, there is no semi-distribution issue in the series

with different variables. It was also discovered that the response and explanatory factors had a strong association. If the model variables are integrated at the second difference, asymmetric analysis cannot be employed. As a consequence, we will analyze some of the statistics to figure out what went wrong in the investigation.

Table 1. Summary statistics.

	ECG	INF	POV	UNE	POG
Mean	1.302	1.992	4.503	−0.140	0.903
Median	1.542	2.059	4.518	−0.522	0.850
Maximum	2.041	3.650	4.610	1.459	1.171
Minimum	−0.935	-0.915	4.329	−0.978	0.682
Std. Dev.	0.648	0.760	0.081	0.801	0.151
Skewness	−1.563	−1.355	−0.572	1.116	0.205
Kurtosis	5.499	7.647	2.203	2.552	1.608
Jarque-Bera	23.377	42.210	2.838	7.563	3.072
Probability	0.000	0.000	0.241	0.022	0.215

Table 2. Correlation amid the study variables.

	ECG	INF	POV	UNE	POG
ECG	1.000	−0.281	0.184	−0.190	0.263
INF	−0.281	1.000	0.311	−0.409	0.190
POV	0.184	0.311	1.000	−0.815	0.847
UNE	−0.190	−0.409	−0.815	1.000	−0.716
POG	0.263	0.190	0.847	−0.716	1.000

4.2. Stationarity Testing Amid the Variables

The unit root test was used in this study to keep track the stability of the variables. The consequences of the test to determine the unit root are shown in Table 3. The order of integration for each variable was examined using two unit root approaches, including Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) [43,44]. According to test statistics, the variables reveal a stationary trend. The model's non-stationary variables are changed into stationary variables in a single step using the integral modification I(1). A measure of stationarity dictates that the variables can't be eliminated one after the other, as they are believed to be stationary.

Table 3. Unit root testing.

	ECG	INF	POV	UNE	POG
ADF Tests (at the Level) I(0)					
T-stat. and *p*-values *	−2.421 (0.143)	−4.163 (0.002)	0.545 (0.985)	0.015 (0.953)	−1.646 (0.445)
At the first difference I(1)					
T-stat. and *p*-values *	−6.166 (0.000)	−8.746 (0.000)	−7.729 (0.000)	−5.578 (0.000)	−3.344 (0.003)
P-P test (at the level) I(0)					
T-stat. and *p*-values *	−2.179 (0.217)	−4.179 (0.002)	−1.121 (0.696)	−0.105 (0.940)	−1.036 (0.729)
At the first difference I(1)					
T-stat. and *p*-values *	−6.294 (0.000)	−9.579 (0.000)	−15.136 (0.000)	−5.604 (0.000)	−2.387 (0.152)

Note: * Displays MacKinnon's single-sided probability values (1996).

4.3. Bounds Testing to Cointegration

This analysis examined the impact of inflation, poverty, unemployment, and population growth on economic growth in Pakistan using the NARDL methodology. In order to complete the bounds test with the cointegration assessment, the F-statistic should be created in an acceptable period of time, according to the AIC (Akaike Information Criterion). Table 4 shows that the F statistic produces statistically significant estimates.

Table 4. Bounds test to cointegration.

	N-Hypothesis Founds No Levels Connection		
	Significance	**I(0)**	**I(1)**
F-stat value (4.977)	10%	(1.85)	(2.85)
	5%	(2.11)	(3.15)
	2.5%	(2.33)	(3.42)
	1%	(2.62)	(3.77)

In addition, this study also used the cointegration technique of Johansen and Juselius with critical values of 5% [45], and the consequences of this are explored in Table 5.

Table 5. Cointegration technique among the study variables.

Hypo-No. of CE(s)	**Eig-Value**	**Tra-Stat**	**C-Values (0.05)**	**Prob. ****
None *	0.864	105.395	69.818	0.000
At most 1	0.530	39.362	47.856	0.246
At most 2	0.250	14.432	29.797	0.815
At most 3	0.131	4.932	15.494	0.815
At most 4	0.008	0.290	3.841	0.589
Maximum Eigenvalue				
Hypo-No. of CE(s)	**Eig-value**	**Max-Eigen Stat**	**C-Values (0.05)**	**Prob. ****
None *	0.864	66.032	33.876	0.000
At most 1	0.530	24.929	27.584	0.105
At most 2	0.250	9.500	21.131	0.790
At most 3	0.131	4.642	14.264	0.786
At most 4	0.008	0.290	3.841	0.589

Note: * Specifies the denial of the hypothesis at the 0.05 level; ** shows the probability values of MacKinnon-Haug-Michelis (1999).

4.4. Optimal Lag Length Criteria

We should consider the model's dynamic qualities while selecting an appropriate lag duration. AIC (Akaike Information Criterion) is commonly used in data analysis to determine the optimal order of lagged data. As a result of these criteria, we used AIC (Akaike Information Criterion) to determine the appropriate lag lengths for variables that should be included in the model. Table 6 reports the outcomes of the optimal lag length criteria.

Table 6. Optimal lag length criteria.

(Lag)	**(LogL)**	**(LR)**	**(FPE)**	**(AIC)**	**(SC)**	**(HQ)**
0	−6.232	NA	1.36×10^{-6}	0.680	0.907	0.757
1	106.617	184.662	6.76×10^{-9}	−4.643	−3.283	−4.185
2	167.398	81.041 *	8.64×10^{-10} *	−6.812 *	−4.317 *	−5.972 *

Note: * Designates the selected lag order by the criterion.

4.5. Asymmetric Analysis Outcomes

The asymmetric analysis results are presented in Table 7. The short-run analysis outcomes show that inflation, poverty and population growth have coefficients of (−0.706), (−0.280), (−6.132), (−5.594), (−7.926), and (−7.079) with probability values of (0.004), (0.245), (0.297), (0.120), (0.524), and (0.020), respectively, which shows their adversative linkage to the economic growth of Pakistan. Furthermore, the variable unemployment has coefficients of (0.133) (1.156) with probability values of (0.686) and (0.020) through positive and negative shocks.

Table 7. Asymmetric long-run and short-run dynamics.

Asymmetric Short-Run Estimation				
Variables	**Coefficients**	**Std. Error**	**t-Stat**	**Prob.**
C	1.485	0.574	2.584	0.016
ECG(−1)	−0.789	0.195	−4.041	0.000
INF_POS(−1)	−0.706	0.223	−3.156	0.004
INF_NEG	−0.280	0.235	−1.192	0.245
POV_POS	−6.132	5.743	−1.067	0.297
POV_NEG	−5.594	3.462	−1.615	0.120
UNE_POS	0.133	0.327	0.408	0.686
UNE_NEG	1.156	1.142	1.011	0.322
POG_POS	−7.926	12.260	−0.646	0.524
POG_NEG	−7.079	2.845	−2.488	0.020
D(INF_POS)	−0.154	0.207	−0.742	0.465
CointEq(−1)	−0.789	0.121	−6.476	0.000
Asymmetric long-run				
Variables	**Coefficients**	**Std. error**	**t-Stat**	**Prob.**
INF_POS	−0.894	0.297	−3.008	0.006
INF_NEG	−0.355	0.285	−1.245	0.225
POV_POS	−7.766	7.300	−1.063	0.299
POV_NEG	−7.085	4.475	−1.583	0.127
UNE_POS	0.169	0.422	0.400	0.693
UNE_NEG	1.464	1.503	0.973	0.340
POG_POS	−10.038	15.140	−0.663	0.514
POG_NEG	−8.965	4.063	−2.206	0.038
C	1.880	0.519	3.621	0.001
Stability tests				
R^2	0.590	AIC		1.679
Adj-R^2	0.430	SC		2.133
S.E. of regression	0.495	HQC		1.832
Sum squared resid	5.653	D-Watson stat		2.457
F-stat	3.684			
Prob(F-stat)	0.005			

Similarly, the outcomes from the long-run analysis demonstrate that inflation, poverty and population growth have coefficients of (−0.894), (−0.355), (−7.766), (−7.085), (−10.038),

and (−8.965) with probability values of (0.006), (0.225), (0.299), (0.127), (0.514), and (0.038), exposing the negative impact on the economic growth via positive and negative shocks. The variable unemployment shows a constructive linkage to economic growth through the positive and negative shocks.

In every economy, inflation and unemployment are grave concerns. Macroeconomic policy aims to keep inflation and unemployment low as part of the wider macroeconomic policy goal. Obviously, the government's macroeconomic priorities include maintaining stable domestic prices, steady economic growth, and employment stability. Unemployment, inflation, and the production growth rate are the three most important indices of macroeconomic success. When inflation and exchange rates destabilize GDP (Gross Domestic Product), economic evidence shows a range of responses. This is because the link between fluctuating exchange rates and GDP is especially troublesome in emerging and developing economies. Furthermore, the survey's findings about the relationship between exchange rate volatility and inflation-GDP are not widely recognized. It is critical to investigate the link between exchange rate volatility, inflation, and income from a regional perspective [46,47]. In order to ensure that individuals have the ability to have normal, healthy, and sustainable lives, poverty is a major concern in the economy. Poverty may be reduced by identifying its roots and effects. Unemployment rises as a result of poverty, which hampers economic progress. Poverty is also a result of low salaries and sluggish economic development, on the other hand. This shows that poverty, unemployment, and economic growth all have a dynamic causal connection. In order to come up with comprehensive recommendations for ending poverty, experts must take into consideration the dynamic interaction between poverty and the factors that cause it [48,49].

Poverty has an impact on many aspects of a person's life, not only their financial condition or ability to sell products and services. The primary reasons for rising poverty are unemployment and inflation. As a result, if poverty is not tackled swiftly but rather via discussion, the country's welfare and national progress would suffer. The problem of global population growth is a difficult one to address. A country will be successful in economic development if it can deal with three significant issues: rising poverty, declining income levels, and no change in employment [50]. Poverty is essentially economic in nature, characterized as a lack of access to vital commodities and services. Poverty is quantified and categorized based on consumption to show how widespread and pervasive it is and who is and is not affected by it. People who can't afford a minimal set of goods and services are considered to be poor in a particular society. Poverty is a lack of access to productive resources like land, capital, and money. As a result, many people live in poverty, are jobless, and suffer from starvation. People's capacity to improve their quality of life by using the productive resources they already have is harmed when they have limited or no access to resources. The inefficient utilization of public resources may also lead to poverty. Low productivity, poverty, and poorer economic growth may be caused by a lack of access to technology and financing, a bad policy environment, or other factors [51–53].

Poverty may be influenced by a number of factors, including population growth. To suggest that a region's population has grown is an understatement. Rapid population expansion creates significant difficulties to welfare and development, and if those problems are not handled with enough financial assistance, the region may experience widespread poverty and instability. As a consequence, it is critical that efforts be made each year to increase the workforce by improving facilities and infrastructure, and by adding high-quality staff. The rate of growth is an important indicator for judging economic growth, especially when looking at national or regional economic development consequences. The economy should continue to grow year after year as more goods and services are created. Thus, economic growth is a measure of the amount of money or wealth that people obtain over time in the context of economic activity. When a country or region has both steady and rapid growth, it indicates a well-functioning economy [54]. On the other side, Hobbs et al. (2021) [55] discovered a long-term link between trade, foreign direct investment (FDI), and economic growth. Ultimately, authorities must devise policies that encourage technology-

based, export-oriented FDI in order to satisfy the demands of the economy and establish specialized industries that are competitive in the global market. Furthermore, Nepelski and De Prato's (2020) [56] analysis showed that a country's place in the global technological sector influences its level of wealth and growth. The key channel through which it occurs is the exclusiveness and originality of a country's technology portfolio in comparison to other nations. Similarly, Hoinaru et al. (2020) [57] discovered some evidence that corruption might be seen as a technique to go beyond the law in order to get more economic gains and so accelerate economic growth. Furthermore, corruption and the shadow economy have a greater and more harmful impact on economic and sustainable development in high-income economies than in low-income ones.

A complicated and dynamic link between population and poverty has been identified in terms of environmental sustainability. Both of these issues are interconnected, as an increasing population necessitates greater agricultural production, which in turn increases emissions of greenhouse gases and causes more deforestation. There are several economic, cultural, political, and developmental aspects that influence the interaction between population, poverty, and the environment [58]. The statistical value of R^2, Adj-R^2, the F-stat and the Durbin-Watson stat are (0.590), (0.430), (3.684) and (2.457). Figure 3 explores the CUSUM and its squares at the 5% level of significance.

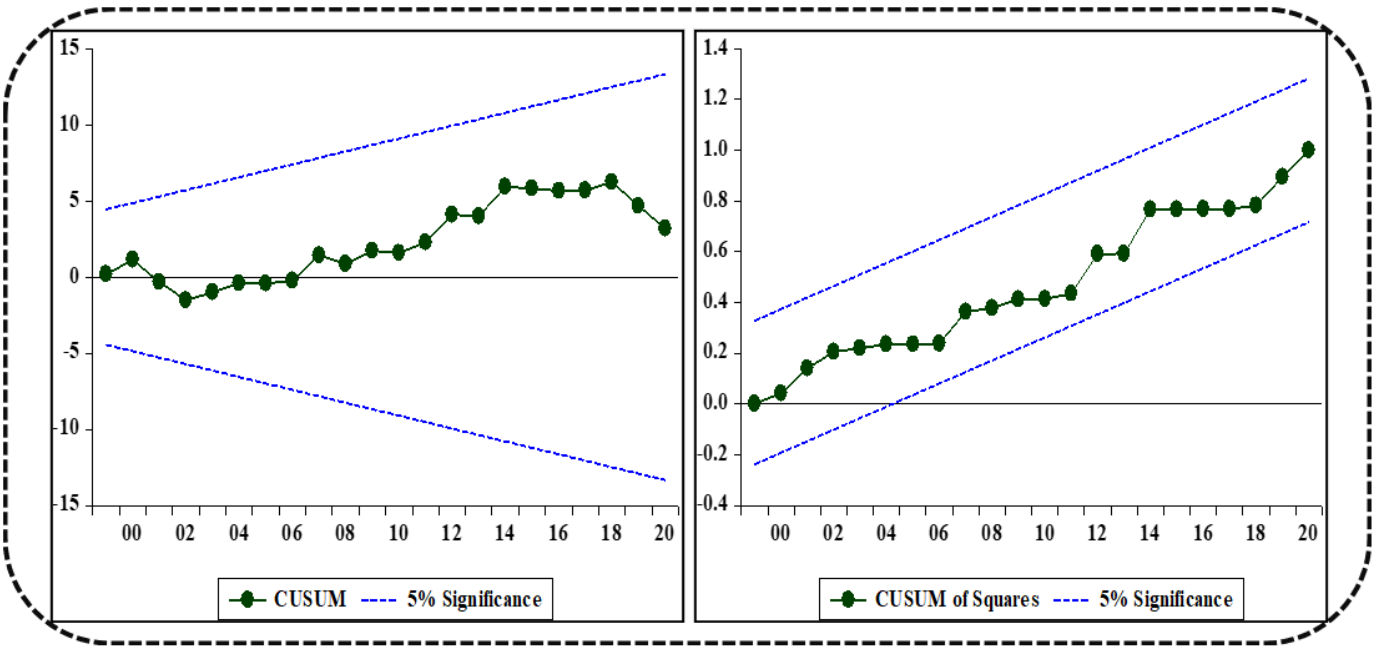

Figure 3. Plot of CUSUM and its square.

Furthermore, Figure 4 illustrates both the positive and negative shocks that may be caused by multiplier effects, such as inflation, poverty, unemployment, and population growth. The plots illustrate the asymmetrical multiplier trends for INF, POV, UNE, and POG by incorporating both positive and negative shocks.

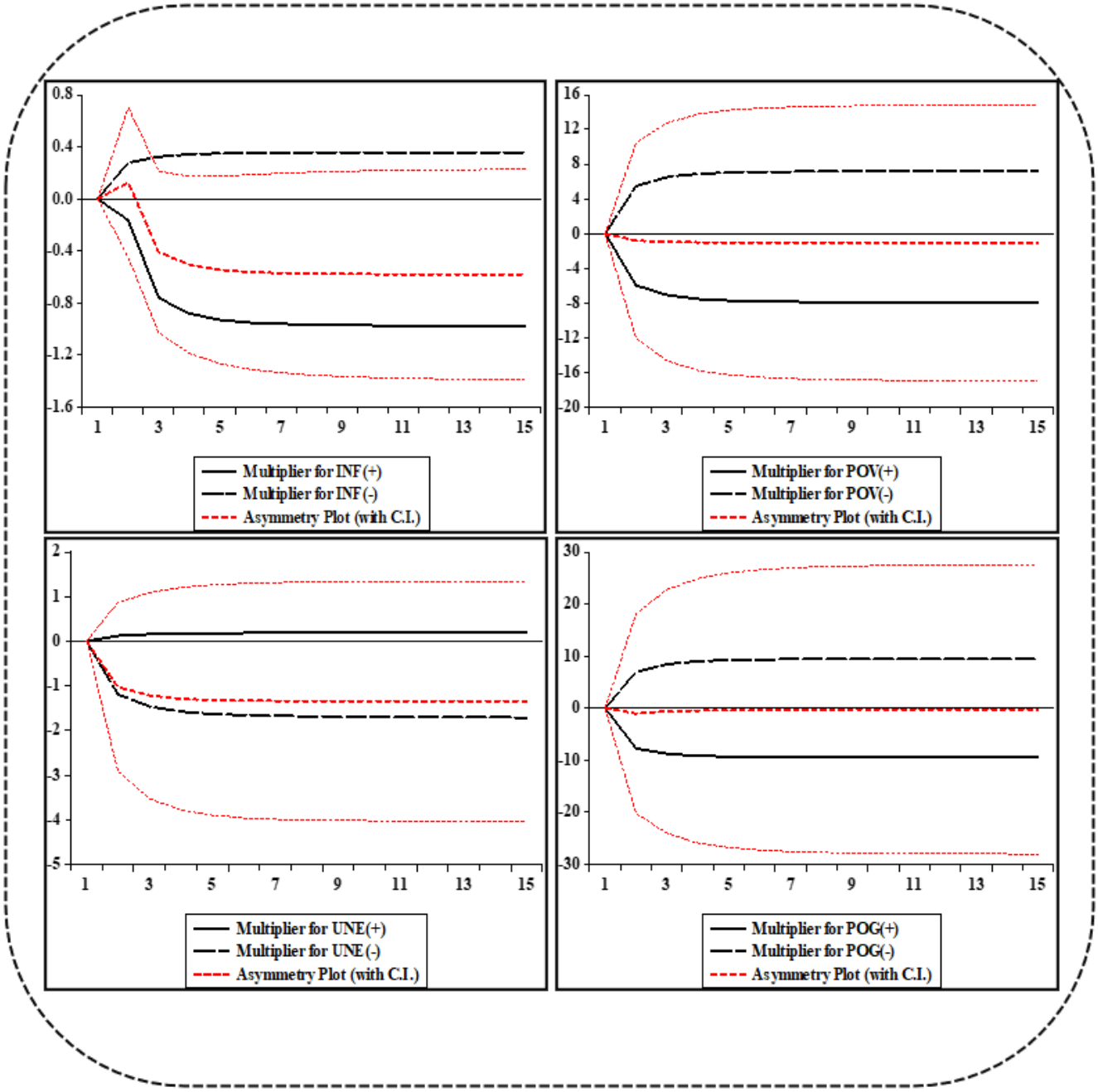

Figure 4. Asymmetric multiplier shocks of the variables.

5. Conclusions and Policy Directions

The influences of inflation, poverty, unemployment and population growth were determined in this study using time series data. In order to check the stationarity, we applied two unit root tests, whereas the Non-linear Autoregressive Distributed Lag method was utilized to uncover the relationships between the variables using short-run and long-run estimations. The outcomes revealed that inflation, poverty, and population growth have adverse associations with the economic growth of Pakistan via positive and negative shocks in both short-run and long-run dynamics. The variable unemployment demonstrates a constructive influence on economic growth via positive and negative shocks in both the short-run and long-run estimations. In Pakistan, economic development and inflation are inextricably linked. In certain instances, there seems to be a link between growing prices

and increases in GDP. New policies and measures will be required for governments in order to properly address this issue.

The people who are poor are those who have less money or resources than other people in their own culture or region. Pakistan is plagued by poverty, which is a huge societal issue. This is a critical problem that affects the whole globe, not just Pakistan. Theft, bribery, corruption, adultery, lawlessness, injustice, and other societal ills may arise as a result of poverty. The state's primary obligation and responsibility is to provide the basic necessities of its citizens. Shelter, food, and clothes are three of the most fundamental human necessities. Socioeconomic issues arise when people's basic needs are not met. These issues have also afflicted Pakistan. However, the real issue is not the fact that these issues are prevalent in society. How they are addressed and resolved is a matter of debate. The consequences of not addressing these issues in a timely manner include deviance, drug abuse, smuggling and corruption, poverty, and illiteracy. People in government have no idea how to deal with everyday problems, and policy is made based on their advice. After the policy was put into place, there has been no noticeable change. When a government policy fails, it introduces a new one without taking into account the implications of the prior one's failure. People were forced to live below the poverty line due to high taxes and unemployment. In terms of Pakistan's economy, this is particularly worrisome, as it is increasing every year. This instills rage and a desire for revenge. Corruption in contract awarding, foreign-funded project start-up, and money laundering by high officials have all harmed Pakistan's reputation in recent decades. In order to restrict and manage inflation, the government's strategy to increase interest rates and lower economic demand must change. Monetarists believe that the quantity of money in circulation has a direct impact on the rate of inflation. Policies that boost the economy's competitiveness and efficiency lower long-term expenditures. Higher income tax rates may be required to rein in spending, demand, and inflationary pressures. This study has certain drawbacks that need more investigation. First, in this study, we used secondary yearly time series data in the context of Pakistan, such that future research may be undertaken using primary data to investigate the relationship between poverty, inflation, and unemployment and economic growth. Second, further study may be conducted to examine the positive and significant influence of other variables such as foreign direct investment, expenditures, revenues, imports and exports, and economic growth using various econometric approaches to discover correlations.

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