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Relationship between GDP & Inflation in India and China

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Abstract: *This paper explores the relation between inflation and Gross Domestic Product (GDP) in India and China during the time period from 1991 to 2021. The study analyzes time-series data from the World Development Indicators database and employs Autoregressive distributed Lag model (ARDL) and error correction models to examine the short-term and long-term dynamics. The research uses the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests to check for stationarity in the variables (including GDP, GCF, Inflation, Male and Female labor force participation, and FDI). Bounds F and T tests are used to check for cointegration, and a Granger causality test is conducted to identify any causal relationships between the variables. The findings reveal that there is a positive short-term relationship between GDP and inflation in India, whereas in China, there is a positive short-term and negative long-term relationship between GDP and Inflation. Additionally, the study reveals that there is no causal relationship between GDP and inflation in India, while in China, the causality runs unidirectionally from GDP to inflation. Policymakers in India may need to adopt measures that balance the need for economic expansion with the need to maintain inflation within a manageable range to ensure sustainable economic growth. In China policymakers may need to focus on long-term strategies to manage inflation and maintain sustainable economic growth at the same time prioritizing strategies that promote economic growth as a means of managing inflation..*

Key Word: *Inflation; GDP; India; China; ARDL*

I.INTRODUCTION

Gross Domestic Product (GDP) and inflation are two key indicators used to evaluate the performance of an economy. GDP measures the total value of goods and services produced within a country over a given period, while inflation reflects the increase in prices of goods and services over time. The relationship between these two variables is of great interest to economists and policymakers because they are often seen as important drivers of economic growth. In this research paper, we aim to explore the relationship between GDP and inflation in two of the world's largest and fastest-growing economies, India and China. These countries have experienced remarkable economic growth over the past few decades, but they have also faced challenges in managing inflation. Understanding the relationship between these variables in these two countries can provide valuable insights for policymakers and investors. Understanding the relationship between GDP and inflation in India and China is crucial due to their significant role in the global economy, accounting for a significant share of world GDP and population. Therefore, their economic performance has a considerable impact on global economic growth and stability. The changes in their GDP and inflation rates could affect global demand for commodities, trade patterns, and financial markets. Besides, these countries' policy decisions can also have spillover effects on other countries, particularly in their regions. The potential implications of research findings for policymakers and investors in India and China are also significant. Policymakers can use these findings to design more effective macroeconomic policies that balance growth and stability objectives. For example, if research finds a positive relationship between GDP and inflation, policymakers may need to prioritize inflation control measures to avoid overheating the economy. Conversely, if research finds a negative relationship between GDP and inflation, policymakers may need to focus more on stimulating growth to avoid a recession. Investors can also benefit from research findings by gaining a better understanding of the economic trends and risks in these countries.The history of inflation in these two countries provides a compelling reason to investigate the relationship between GDP and inflation further.

II.REVIEW OF LITERATURE

Jayathileke and Rathnayake (2013) investigate the relationship between inflation and economic growth in three Asian countries (China, India, and Sri Lanka) using cointegration, causality, and error correction techniques. The study finds a long-run negative relationship between economic growth and inflation in Sri Lanka, while no significant relationship was found for China and India in the long run. However, a short-run negative relationship was found for China, and a unidirectional causality running from economic growth to inflation was detected in China. The study emphasizes the importance of macroeconomic policies for achieving stable and sustainable growth.

Mallik and Chowdhury (2001) investigate the relationship between inflation and economic growth for four South Asian countries using cointegration and error correction models. They find a long-run positive relationship between GDP growth rate and inflation, with significant feedbacks between the two variables. The authors highlight the importance of moderate inflation for growth, but caution that attempting to reduce inflation to very low levels could adversely affect economic growth. Similarly, attempts to achieve faster economic growth may lead to an unstable inflation rate, putting these economies on a knife-edge.

Manamperi (2014) investigates the short and long-run relationships between inflation and economic growth in BRICS countries over the last three decades. The study employs Johansen cointegration and autoregressive distributed lag (ARDL) model for long-run relationship, and a VAR analysis for short-run dynamics. The study found a positive long-run relationship between inflation and economic growth for India, but no long-run relationship in other four countries. A significant negative short-run relationship is found for Brazil, Russia, China and South Africa while a positive short-run relationship is found for India.

Barro (1995) reviews the academic literature on the costs of inflation and finds that while there is theoretical work suggesting inflation is a bad idea, the empirical evidence is not overwhelming. Therefore, additional empirical research on the relation between inflation and economic performance is needed. His study finds that the estimated effects of inflation on growth and investment are significantly negative, providing evidence for adverse effects of inflation on economic performance. Furthermore, even seemingly small estimated effects of inflation on growth can have dramatic effects on standards of living over long periods.

Hoang Tien Nguyen (2021) investigates the nonlinear relationship between inflation and GDP growth in Vietnam to propose a target inflation rate for economic stability and growth. The study confirms the existence of a threshold at 6% inflation point, suggesting Vietnam authorities should target lower inflation to improve GDP growth. The literature suggests that the relationship between inflation and GDP growth is country-specific, and conducting research on inflation-GDP growth relationship is essential for better policy responses. The findings support the Philips Curve theory and the threshold often found high in developing countries and decreases with development.

Khan and Senhadji (2001) use new econometric techniques to estimate the threshold level of inflation above which inflation significantly slows growth for both industrial and developing countries. They find that the negative and significant relationship between inflation and growth is quite robust with respect to the estimation method, perturbations in the location of the threshold level, the exclusion of high-inflation observations, data frequency, and alternative specifications. The authors suggest a strong and negative effect of inflation on growth even when data have been averaged over five years. However, they caution that the estimated relationship does not provide the precise channels through which inflation affects growth and that inflation may have adverse effects on the economy beyond that on growth.

Pattanaik and Nadhanael (2013) provide analytical justifications for why high inflation impedes growth and offer cross-country evidence on the non-linear relationship between inflation and growth. Their empirical findings suggest that for India, the threshold level of inflation could be around 6%. The authors caution that any positive inflation beyond this threshold could pose a risk to inclusive and sustainable growth objectives. They argue that a central bank can best contribute to the growth objective by ensuring a low and stable inflation regime. The estimated threshold inflation level of 6% should not be seen as a rigid rule, particularly in view of the significant changes to the growth–inflation mix that India has experienced in the last decade or so.

Hodge (2006) examines the relationship between inflation and growth in South Africa. The findings indicate a negative relationship between inflation and growth in the long term, while in the short run, growth above its trend requires accelerating inflation. Therefore, to substantially improve the present low trend growth in South Africa, inflation targeting would have to be abandoned, which would be counterproductive over the longer term. The study also reveals limited scope for promoting higher growth at the cost of higher inflation in the short run.

Bruno and Easterly (1996) reviewed the literature on the relationship between inflation and growth. Early studies found little evidence of a relationship, while later studies focused on the impact of discrete high inflation crises. However, it remained unclear whether the relationship was long-term or short-term. The authors' own recent work challenged the conventional wisdom that inflation and growth are positively related in the short run and negatively related in the long run.

They found no evidence of a relationship between inflation and growth at annual inflation rates below 40%, and a negative relationship between high inflation and growth in the short to medium run. However, they also found no lasting damage to growth from discrete high inflation crises.

Saungweme and Odhiambo (2021) examine the relationship between inflation and economic growth in Kenya from an empirical standpoint. Applying the autoregressive distributed lag (ARDL) bounds testing approach, the study finds that inflation has a statistically significant negative influence on long-term economic growth. Furthermore, the multivariate Granger-causality results show a distinct short-run unidirectional causality from economic growth to inflation in Kenya. The study recommends that Kenya's government should pursue prudent monetary, financial, and fiscal policies to mitigate the negative consequences of inflation and the coronavirus on the economy and welfare.

Ijaz Uddin (2018) conducted an empirical study to investigate the impact of inflation on GDP growth in Pakistan using time series data from 1990 to 2015. The study applied the ADF test for stationary and the Engel Granger Co-integration test for short and long-run association. The results revealed a significant positive relationship between GDP growth and inflation in Pakistan, suggesting that a 1% increase in inflation would cause a 0.27% increase in GDP growth.

Ahmmed et al. (2020) investigated the relationship between inflation and economic growth for ten selected countries. The study used yearly data series from the World Bank Development Indicator, and found that the connection between inflation and economic growth varied across countries, with some countries exhibiting a positive correlation (Malaysia, Thailand, Singapore, Japan, and Bangladesh), and others showing a negative correlation (USA, Pakistan, UK, and India). The study also found that the sensitivity of inflation to changes in growth varied across countries, as did the sensitivity of growth to changes in inflation. These findings have implications for policymakers in the respective countries.

Saaed (2007) studied the relationship between inflation and economic growth in Kuwait using annual data on real GDP and CPI from 1985 to 2005. The author found a statistically significant long-run negative relationship between inflation and economic growth, implying that a stable long-run relationship exists between the two variables. The author suggested that this has important policy implications for both domestic policymakers and development partners, particularly for conducting monetary policy. Inflation rates affect economic growth rates negatively, and vice versa.

Singh and Kalirajan (2003) investigated the inflation-growth nexus in India, using annual data from 1971-1998. Their findings indicate that any increase in inflation negatively affects economic growth, and maintaining price stability is crucial for India's growth. Bringing down inflation to the level of major trading partners can increase per capita growth by about two percentage points. While central banks in developing countries aim for price stability, they also shoulder other responsibilities, including structural development and adequate credit creation. The ability of central banks to control inflation in developing countries is not better than those in developed countries.

Jha and Dang (2012) investigate the effect of inflation variability on economic growth using annual data covering 182 developing and 31 developed countries from 1961 to 2009. The authors find that for developing countries, inflation variability has a negative effect on growth when the inflation rate exceeds 10%, while no such evidence is found for developed countries. The study uses the coefficient of variation of inflation over five years as a proxy for inflation variability and employs the econometric technique of Hansen (1999) to obtain robust results.

Ghosh and Phillips (1998) examine the relationship between inflation and growth using panel regressions and find a significant negative relationship between inflation and growth at all but the lowest inflation rates. They identify inflation as one of the most important determinants of growth, with the moderate or intermediate inflation range being of greatest interest. Their results suggest that the negative relationship between inflation and growth is nonlinear, and failure to account for these nonlinearities can bias results towards finding only a small effect. They emphasize that their study does not claim to locate a "growth-maximizing" rate of inflation, which remains an open and difficult question worthy of future research.

Mandeya and Ho (2021) examined the impact of inflation and inflation uncertainty on economic growth in South Africa using the autoregressive distributed lag (ARDL) estimation technique. The authors found that inflation negatively affects growth in both the short and long run, while inflation uncertainty has no long-run bearing in South Africa. Additionally, after the adoption of inflation targeting, inflation uncertainty lost its relevance as a factor determining economic growth. Therefore, policymakers should continue to pursue policies that ensure price stability to promote economic growth.

Onwubuariri (2021) examined the impact of inflation, interest rate, exchange rate, and government expenditure on Nigeria's economic growth from 1980-2019. Using ARDL and ECM, the study found that inflation has a negative effect on economic growth by reducing competitiveness and purchasing power. The study recommends measures to be put in place by the CBN to reduce inflation. The real interest rate has a positive effect on economic growth, while exchange rate volatility reduces confidence in the economy. Government consumption expenditure has a positive but insignificant relationship with economic growth.

Salamai, Faisal, and Khan (2022) explores the relationship between GDP and inflation in Saudi Arabia from 1969 to 2020 using econometric models. The study incorporates various literature reviews to address research gaps and provide context.

The OLS model was used to show that there is no significant association between GDP and inflation rate in Saudi Arabia during the period studied.

Karahan and Çolak (2018) investigate the relationship between inflation and economic growth in Turkey by using the Nonlinear Autoregressive Distributed Lag (NARDL) model. Previous studies have largely ignored the possible nonlinear relationship between inflation and economic growth. The results suggest a negative asymmetric long-term economic growth reaction to inflation. Therefore, to promote long-term economic growth, anti-inflationary policies should be implemented in Turkey. The Central Bank of the Republic of Turkey (CBRT) has significant justification in maintaining the Inflation Targeting (IT) Monetary Policy implemented since 2001.

III.RESEARCH GAP

There is no recent study that has examined the relationship between inflation and GDP in India and China using Autoregressive Distributed Lag (ARDL) models and Granger causality tests, particularly for the period of 1991-2021. While some previous studies have analyzed this relationship in India and China, they have used different time periods, methodologies, and data sources, making it difficult to compare their findings. Therefore, this study aims to fill this research gap by using recent data and advanced statistical techniques to provide new insights into the relationship between GDP and inflation. This research aims to contribute to the existing literature by examining the short-term and long-term relationship between GDP and inflation, cointegration, and causality between these two variables in India and China using ARDL models and Granger causality tests.

IV.OBJECTIVE

- To study trends in GDP and inflation using time series analysis.
- To analyse the strength of relationship between GDP growth and inflation since the 1990s.
- To examine the impact of inflation on GDP in India and China using ARDL and error correction models.
- To identify any causal relationships between the variables.

V.METHODOLOGY

This research aims to investigate the relationship between GDP and Inflation, by utilizing time-series data sourced from the World Development Indicators (WDI) database for India and China between the years 1991 to 2021. The selected independent variables include Gross capital formation, Inflation, Female labor force participation, Male labor force participation, and Foreign direct investment, which are chosen based on their theoretical relevance to the relationship between GDP and inflation. The choice of India and China as the study's target countries is justified by their significant contributions to global economic growth and their different economic models. The 1991-2021 period is significant for analyzing the relationship between GDP and inflation in India and China, coinciding with major economic transformations and expansions in both countries. India's economic reforms after a balance of payments crisis led to a significant increase in real GDP per capita, while China sustained over 9% annual growth and became the world's second-largest economy. Examining this period can provide valuable insights into how these nations managed their economies during a time of rapid growth and change.

Table no 1: Shows the Variable used and their description and formulation

Variable	Description
Gross Domestic Product	GDP growth (annual %) measures the annual percentage change in the value of goods and services produced by an economy and is calculated as ((GDP at constant prices in current year - GDP at constant prices in previous year) / GDP at constant prices in previous year) * 100
Gross Capital Formation	Gross capital formation (% of GDP) measures the value of acquisitions of new or existing fixed assets by the business sector, governments and "pure" households less disposals of fixed assets and is calculated as (Gross capital formation / GDP) * 100
Inflation	Inflation, consumer prices (annual %) measures the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals and is calculated as ((Consumer Price Index in current year - Consumer Price Index in previous year) / Consumer Price Index in previous year) * 100.
Female Labor Force Participation	Female Labor Force Participation rate is the proportion of the female population ages 15-64 that is economically active: all females who supply labor for the production of goods and services during a specified period and is calculated as (Number of females in labor force / Female population aged 15-64) * 100
Male Labor Force Participation	Male Labor Force Participation rate is the proportion of the male population ages 15-64 that is economically active: all males who supply labor for the production of goods and services during a specified period and is calculated as (Number of males in labor force / Male population aged 15-64) * 100
Foreign Direct Investment	Foreign direct investment (FDI) is an investment made by a firm or individual in one country into business interests located in another country and is calculated as (Total inflows of FDI - Total outflows of FDI)

Statistical Techniques

We used advanced econometric techniques to examine the relationship between GDP and inflation in India and China. Initially, we converted the variables into time series objects and applied a logarithm transformation to reduce outliers and stabilize variance. Stationarity of the data was checked using Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests. We chose the KPSS test due to its higher power in detecting non-stationarity with deterministic trends, which is suitable for GDP and inflation series. For analyzing the long-run relationship, we employed the Autoregressive Distributed Lag (ARDL) model, which incorporates lagged dependent and explanatory variables. The ARDL model captures both short-run and long-run dynamics, making it ideal for studying GDP and inflation over time. Bounds tests based on F-distribution and t-distribution were used to determine the existence of a long-run relationship without imposing restrictions. To examine short-run dynamics, we estimated an Error Correction Model (ECM) that measures the speed of adjustment towards the long-run equilibrium. Restricted and unrestricted ECM models were compared to identify the appropriate specification. Additionally, we conducted a Granger causality test to investigate the predictive power of past values on the current value of GDP and inflation.

Model Specification

For India, the ARDL model specification is:

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta LGDP_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta LGCF_{t-i} + \sum_{i=0}^{n} \beta_{3i} \Delta LINF_{t-i} + \sum_{i=0}^{n} \beta_{4i} \Delta LFLFP_{t-i} + \sum_{i=0}^{n} \beta_{5i} \Delta LMLFP_{t-i} + \sum_{i=0}^{n} \beta_{6i} \Delta LFDI_{t-i} + \alpha_1 LGDP_{t-1} + \alpha_2 LGCF_{t-1} + \alpha_3 LINF_{t-1} + \alpha_4 LFLFP_{t-1} + \alpha_5 LMLFP_{t-1} + \alpha_6 LFDI_{t-1} + \varepsilon_{1t} \quad (1)$$

Where β_0 is the constant; $\beta_1 - \beta_6$ and $\alpha_1 - \alpha_6$ are short-run and long-run regression coefficients, respectively; Δ is the difference operator; n is the lag length; ε_{1t} is the error term; t is the time period; and all other variables are as described in Table 3.1. The unrestricted error correction model (UECM) is derived from the ARDL model by subtracting the lagged levels of the dependent variable from both sides of the equation and rearranging the terms. The resulting UECM equation has the form:

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta LGDP_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta LGCF_{t-i} + \sum_{i=0}^{n} \beta_{3i} \Delta LINF_{t-i} + \sum_{i=0}^{n} \beta_{4i} \Delta LFLFP_{t-i} + \sum_{i=0}^{n} \beta_{5i} \Delta LMLFP_{t-i} + \sum_{i=0}^{n} \beta_{6i} \Delta LFDI_{t-i} + \gamma_1 ECM_{t-1} + \varepsilon_{2t} \quad (2)$$

$$, ECM = \alpha_1 (LGDP_{t-1} - LGCF_{t-1} - LINF_{t-1} - LFLFP_{t-1} - LMLFP_{t-1} - LFDI_{t-1})$$

In the (2) equation the ECM_{t-1} is the error correction term lagged by one period which captures the deviation from the long-run equilibrium relationship between the variables and γ_1 is the coefficient of ECM. The coefficient α_1 represents the speed of adjustment back to the equilibrium. The restricted error correction model (RECM) is derived from the UECM by imposing additional restrictions on the coefficients of the lagged levels of the independent variables in the error correction term. The specific form of the RECM equation depends on the restrictions that are imposed. The restrictions are imposed such that the coefficients of the lagged levels of the independent variables in the error correction term sum to 1. This implies that the long-run equilibrium relationship between the variables is normalized with respect to the dependent variable. The RECM equation corresponding to the ARDL model would be:

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\Delta LGDP_{t-i} + \sum_{i=0}^{n} \beta_{2i}\Delta LGCF_{t-i} + \sum_{i=0}^{n} \beta_{3i}\Delta LINF_{t-i} + \sum_{i=0}^{n} \beta_{4i}\Delta LFLFP_{t-i} + \sum_{i=0}^{n} \beta_{5i}\Delta LMLFP_{t-i} + \sum_{i=0}^{n} \beta_{6i}\Delta LFDI_{t-i} + \delta_1 ECM_{t-1} + \varepsilon_{3t} \quad (3)$$

$$, ECM = \alpha_1(LGDP_{t-1} + \theta_1 LGCF_{t-1} + \theta_2 LINF_{t-1} + \theta_3 LFLFP_{t-1} + \theta_4 LMLFP_{t-1} + \theta_5 LFDI_{t-1})$$

For China, the ARDL model specification is:

$$\Delta LGDP_t = \emptyset_0 + \sum_{i=1}^{n} \emptyset_{1i}\Delta LGDP_{t-i} + \sum_{i=0}^{n} \emptyset_{2i}\Delta LGCF_{t-i} + \sum_{i=0}^{n} \emptyset_{3i}\Delta LINF_{t-i} + \sum_{i=0}^{n} \emptyset_{4i}\Delta LFLFP_{t-i} + \sum_{i=0}^{n} \emptyset_{5i}\Delta LMLFP_{t-i} + \sum_{i=0}^{n} \emptyset_{6i}\Delta LFDI_{t-i} + \sigma_1 LGDP_{t-1} + \sigma_2 LGCF_{t-1} + \sigma_3 LINF_{t-1} + \sigma_4 LFLFP_{t-1} + \sigma_5 LMLFP_{t-1} + \sigma_6 LFDI_{t-1} + \mu_{1t} \quad (4)$$

Where $\emptyset_0$ is the constant; $\emptyset_1 - \emptyset_6$ and $\sigma_1 - \sigma_6$ are short-run and long-run regression coefficients, respectively; Δ is the difference operator; n is the lag length; μ_{1t} is the error term; t is the time period; and all other variables are as described in Table 2.

The unrestricted error correction model (UECM) is derived by subtracting the lagged levels of the dependent variable from both sides of the equation and rearranging the terms. The resulting UECM equation is of the form:

$$\Delta LGDP_t = \emptyset_0 + \sum_{i=1}^{n} \emptyset_{1i}\Delta LGDP_{t-i} + \sum_{i=0}^{n} \emptyset_{2i}\Delta LGCF_{t-i} + \sum_{i=0}^{n} \emptyset_{3i}\Delta LINF_{t-i} + \sum_{i=0}^{n} \emptyset_{4i}\Delta LFLFP_{t-i} + \sum_{i=0}^{n} \emptyset_{5i}\Delta LMLFP_{t-i} + \sum_{i=0}^{n} \emptyset_{6i}\Delta LFDI_{t-i} + \varphi_1 ECM_{t-1} + \mu_{2t} \quad (5)$$

$$ECM = \sigma_1(LGDP_{t-1} - LGCF_{t-1} + LINF_{t-1} + LFLFP_{t-1} + LMLFP_{t-1} + LFDI_{t-1})$$

The RECM equation corresponding to the ARDL model for China is:

$$\Delta LGDP_t = \emptyset_0 + \sum_{i=1}^{n} \emptyset_{1i}\Delta LGDP_{t-i} + \sum_{i=0}^{n} \emptyset_{2i}\Delta LGCF_{t-i} + \sum_{i=0}^{n} \emptyset_{3i}\Delta LINF_{t-i} + \sum_{i=0}^{n} \emptyset_{4i}\Delta LFLFP_{t-i} + \sum_{i=0}^{n} \emptyset_{5i}\Delta LMLFP_{t-i} + \sum_{i=0}^{n} \emptyset_{6i}\Delta LFDI_{t-i} + \omega_1 ECM_{t-1} + \mu_{3t} \quad (6)$$

$$,ECM = \sigma_1(LGDP_{t-1} - \theta_1 LGCF_{t-1} + \theta_2 LINF_{t-1} + \theta_3 LFLFP_{t-1} + \theta_4 LMLFP_{t-1} + \theta_5 LFDI_{t-1})$$

VI.RESULTS & DISCUSSIONS

Descriptive Statistics

Table no2: Descriptive Statistics

	N	Mean		Median		Standard Deviation		Jarque – Bera P-value	
Variable		India	China	India	China	India	China	India	China
GDP	31	5.92	9.24	6.65	9.23	3.03	2.61	0.72	0.85
GCF	31	31.73	40.81	30.95	40.81	5.44	4.01	0.48	0.42
INF	31	7.14	3.95	6.37	2.41	3.17	5.47	0.24	0.66
FLFP	31	28.59	73.17	31.68	71.82	4.32	4.11	0.11	0.15
MLFP	31	83.82	85.49	84.95	84.36	2.39	2.52	0.18	0.13
FDI	31	-1448.88	-7995.81	-599.22	-5025.98	1481.59	6792.51	0.13	0.21

The descriptive statistics table indicates a sample size of 31 observations for each variable, which is sufficiently large for precise estimates of statistical parameters such as mean, median, standard deviation, and Jarque-Bera p-value. The average GDP for India and China were 5.92 and 9.24, respectively. The marginal differences between mean and median values across all series suggest an overall symmetry of the data set. The Jarque-Bera p-values exceeding 0.05 indicate that the series conform to normal distribution. In conclusion, the presented statistics support the use of this data set for further statistical operations, as it is expected to yield reliable and consistent parameters.

Stationarity Test

Table no3: Stationarity test results

		ADF			PP		KPSS		Results
Country	Variables	I(0)	I(1)	I(2)	I(0)	I(1)	I(0)	I(1)	
India	GDP	-4.47*	-	-	-27.88*	-	0.35*	-	I(0)
	GCF	-0.77	-5.31*	-	-5.74	-41.94*	0.52	0.21*	I(1)
	INF	-2.07	-4.10*	-	-10.82	-36.63*	0.23*	-	I(1)
	FLFP	-2.55	-1.69	-3.97*	-6.31	-26.63*	0.94	0.32*	I(1)
	MLFP	-1.85	-1.90	-4.47*	-4.51	-19.71*	1.05	0.23*	I(1)
	FDI	-3.27	-4.31*	-	-13.97	-31.24*	1.06	0.41*	I(1)
China	GDP	-1.79	-4.76*	-	-23.55*	-	0.60	0.06*	I(1)
	GCF	-2.28	-4.05*	-	-7.95	-18.39*	0.66	0.12*	I(1)
	INF	-2.30	-4.63*	-	-11.81	-30.40*	0.22*	-	I(1)
	FLFP	-1.80	-3.20	-5.53*	-4.58	-38.15*	1.07	0.33*	I(1)
	MLFP	-3.16	-2.73	-5.16*	-4.06	-22.67*	1.05	0.24*	I(1)
	FDI	-3.00	-3.22	-5.98*	-11.09	-26.19*	0.71	0.19*	I(1)
*Note: * denotes significance at 5%.*									

Table 3 presents the results of the stationarity tests conducted for all the variables under study. The table displays the test statistic values for the Dickey-Fuller statistic for ADF, the Dickey-Fuller Z(alpha) statistic for PP test, and the KPSS Level for the KPSS test. To test the stationarity of the variables, they were first subjected to a log transformation. To determine the final stationarity of each variable, a consensus approach was employed based on the outcome of the different tests. For instance, for India's INF variable, two out of three tests indicated an integrated order of I(1), which was then accepted as the final outcome. The same method was applied to all other variables. Notably, the results indicate that the variables have a mixed order of integration, with some being I(0) and others being I(1). In view of these results, the next step is to develop an ARDL model that can accommodate the mixed integration orders of the variables.

Auto Regressive Distributed Lag Models

ARDL models can be used to estimate the long-run relationship between variables by incorporating lagged values of the dependent variable and explanatory variables. Additionally, the ARDL model can also capture short-run dynamics by including the first difference of the dependent and explanatory variables. The results of these models will provide insights into the long-run and short-run dynamics of economic growth in these two countries.

Table no4: ARDL test results for India.

India: Autoregressive Distributed Lag Model Summary				
	Estimate	Std. Error	t value	Probability
(Intercept)	-254.929	86.763	-2.938	0.014*
L(LGDP, 1)	-0.081	0.222	-0.363	0.723
L(LGDP, 2)	-0.160	0.236	-0.680	0.511
LGCF	2.522	0.792	3.182	0.009**
L(LGCF, 1)	1.003	0.626	1.602	0.140
L(LGCF, 2)	0.876	0.637	1.374	0.199
L(LGCF, 3)	-1.587	0.763	-2.080	0.064 .
LINF	0.607	0.227	2.667	0.023*
LFLFP	7.801	5.801	1.345	0.208
L(LFLFP, 1)	-2.321	8.438	-0.275	0.788
L(LFLFP, 2)	3.069	7.624	0.403	0.695
L(LFLFP, 3)	-18.785	5.301	-3.543	0.005**
LMLFP	3.114	26.446	0.118	0.908
L(LMLFP, 1)	7.382	27.533	0.268	0.794
L(LMLFP, 2)	52.372	21.695	2.414	0.036*
LFDI	-0.116	0.188	-0.619	0.549
L(LFDI, 1)	0.324	0.179	1.811	0.100
L(LFDI, 2)	0.187	0.146	1.278	0.230
*Note: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*				

Table 4 presents the statistical analysis results. The ARDL model for India is statistically significant (p-value = 0.053), and the R-squared value of 0.824 indicates a substantial portion of the dependent variable's variability can be explained by the independent variables. The coefficients table shows the estimated coefficients, standard errors, t-values, and p-values. Lagged values of independent variables serve as predictors to capture the time series nature of the data. Negative coefficients indicate a negative relationship between the independent and dependent variables in the short or long term, depending on the lag. The intercept term is significant (p-value = 0.014), suggesting that the baseline level of the dependent variable has a significant impact even after considering other independent variables. The coefficient for LGCF is positive and significant, indicating a positive relationship with the dependent variable. Lagged values of LGCF (L1) are not significant, but the lag at 3 periods (L3) is significant, suggesting a long-term relationship. LINF has a significant positive relationship with the dependent variable. Lagged values of LFLFP and LMLFP also have lasting effects on the dependent variable. Policymakers should consider these effects when making decisions related to the dependent variable.

Table no5: ARDL test results for China

China: Autoregressive Distributed Lag Model Summary				
	Estimate	Std. Error	t value	Probability
(Intercept)	104.252	59.297	1.758	0.112
L(lnGDP 1)	-0.166	0.176	-0.942	0.370
L(lnGDP 2)	0.736	0.478	1.540	0.157
lnGCF	0.747	1.178	0.634	0.541
L(lnGCF 1)	0.624	0.984	0.635	0.541
L(lnGCF 2)	2.696	1.007	2.675	0.025 *
L(lnGCF 3)	2.107	1.020	2.066	0.068 .
lnINF	-0.093	0.059	-1.577	0.149
L(lnINF1)	-0.124	0.060	-2.073	0.068 .
L(lnINF 2)	-0.203	0.054	-3.701	0.004**
lnFLFP	-88.423	47.989	-1.843	0.098 .
L(lnFLFP 1)	143.917	45.500	3.163	0.011 *
lnMLFP	39.057	79.436	0.492	0.634
L(lnMLFP 1)	-48.689	93.083	-0.523	0.613
L(lnMLFP 2)	-72.385	35.061	-2.064	0.068 .
lnFDI	0.188	0.062	2.986	0.015 *
L(lnFDI 1)	-0.007	0.076	-0.099	0.923
L(lnFDI 2)	-0.290	0.121	-2.392	0.040 *
L(lnFDI 3)	0.186	0.094	1.981	0.078 .
*Note: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*				

The ARDL model for China shows a high R-squared value of 0.970, indicating that 97.05% of the variability in the dependent variable (GDP) can be explained by the independent variables in the model. The F-statistic's p-value of 8.635 x 10^-5 indicates that the model as a whole is statistically significant. Lagged variables such as GCF (2 periods ago), FLFP (1 period ago), and FDI (2 periods ago) are found to have a significant effect on GDP. Additionally, lagged inflation variables show a significant negative coefficient, suggesting that higher inflation in the past has led to lower GDP in the present, indicating a delayed impact of inflation on economic activity. This implies that sustained periods of high inflation can be detrimental to economic growth in the long run. To investigate the impact of GDP in the short and long run, error correction is planned, but first, the presence of cointegration between variables in the ARDL models needs to be examined using the Bound F-test and Bounds t-test.

Bound test for cointegration

Table no6: Bound Test results

	Bounds t-test				Bounds F-test	
	t statistic	I(0)	I(1)	p-value	F statistic	p-value
India	-3.449	-3.411	-4.811	0.205	7.459	$4.3x10^{-6}$
China	-0.997	-3.411	-4.811	0.952	4.508	0.014

The test results for cointegration suggest that there is a possibility of a long-term relationship between the variables in the model for India. The t-test results indicate that we cannot reject the null hypothesis of no cointegration at a 1% significance level, but we can at a 5% level. However, the relatively low p-value suggests that there may be some evidence of cointegration, warranting further investigation. On the other hand, for China, the t-test results indicate that we can reject the possibility of cointegration at a 1% significance level. The p-value further supports this rejection. The F-test results suggest evidence of cointegration for both India and China, as the null hypothesis of no cointegration can be rejected. Cointegration is important because it indicates a stable long-term relationship between variables, ensuring that the estimated relationship is not a result of random correlation. Testing for cointegration before using the ECM model helps avoid spurious regression and ensures accurate modeling of the variables.

Unrestricted Error Correction Models

In a UECM, the error correction term reflects the deviation from the long-term equilibrium, and its coefficient estimates the speed at which the dependent variable adjusts to its equilibrium level.

Table no7:UECM test results for India

India: Unrestricted Error Correction Model Summary				
	Estimate	Std. Error	t value	Probability
(Intercept)	-254.929	86.763	-2.938	0.014 *
L(LGDP, 1)	-1.241	0.360	-3.449	0.006 **
L(LGCF, 1)	2.815	0.814	3.457	0.006 **
LINF	0.607	0.227	2.667	0.023 *

L(LFLFP, 1)	-10.235	3.039	-3.367	0.007 **
L(LMLFP, 1)	62.869	21.428	2.934	0.014 *
L(LFDI, 1)	0.395	0.217	1.820	0.098 .
d(L(LGDP, 1))	0.160	0.236	0.680	0.511
d(LGCF)	2.523	0.792	3.182	0.009 **
d(L(LGCF, 1))	0.711	1.029	0.691	0.505
d(L(LGCF, 2))	1.587	0.763	2.080	0.064 .
d(LFLFP)	7.802	5.801	1.345	0.208
d(L(LFLFP, 1))	15.716	5.530	2.842	0.017 *
d(L(LFLFP, 2))	18.785	5.301	3.543	0.005 **
d(LMLFP)	3.114	26.446	0.118	0.908
d(L(LMLFP, 1))	-52.372	21.695	-2.414	0.036 *
d(LFDI)	-0.116	0.188	-0.619	0.549
d(L(LFDI, 1))	-0.187	0.146	-1.278	0.230
*Note: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*				

The model summary provides information about the use of lag and difference operators in the analysis. The lag operator "L" captures the long-term relationship between variables by considering the effect of past values on the current value. The difference operator "d" reflects the short-term relationship by measuring changes between consecutive observations. In the UECM model for India, most variables show a statistically significant relationship with GDP in both the long and short term. The coefficient on the lagged value of GDP indicates that past GDP values have a significant influence on current GDP, which aligns with the idea of economic growth being path-dependent. Variables such as LGCF, LFLFP, and LMLFP have significant coefficients with a delayed effect on LGDP, suggesting that changes in these variables will eventually impact GDP in the long run. Additionally, LINF demonstrates a significant positive relationship, likely indicating a short-term or contemporaneous association.

Table no8: UECM test results for China

China: Unrestricted Error Correction Model Summary				
	Estimate	Std. Error	t value	Probability
(Intercept)	104.252	59.297	1.758	0.112
L(lnGDP, 1)	-0.430	0.431	-0.998	0.344
L(lnGCF, 1)	6.177	1.655	3.730	0.004 **
L(lnINF, 1)	-0.420	0.122	-3.424	0.007 **
L(lnFLFP, 1)	55.494	16.461	3.371	0.008 **
L(lnMLFP, 1)	-82.017	28.467	-2.881	0.018*
L(lnFDI,1)	0.0760	0.108	0.704	0.499
d(L(lnGDP, 1))	-0.736	0.478	-1.540	0.157
d(lnGCF)	0.747	1.178	0.634	0.541
d(L(lnGCF, 1))	-4.804	1.230	-3.906	0.003 **
d(L(lnGCF, 2))	-2.107	1.020	-2.066	0.068 .
d(lnINF)	-0.093	0.059	-1.577	0.149
d(L(lnINF, 1))	0.203	0.054	3.701	0.004 **
d(lnFLFP)	-88.423	47.989	-1.843	0.098 .
d(lnMLFP)	39.057	79.436	0.492	0.634
d(L(lnMLFP, 1))	72.385	35.061	2.064	0.068 .
d(lnFDI)	0.188	0.062	2.986	0.015 *
d(L(lnFDI, 1))	0.104	0.097	1.069	0.313
d(L(lnFDI, 2))	-0.186	0.094	-1.981	0.078 .
*Note: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*				

The test results in Table 8 reveal important findings regarding the relationship between inflation, dependent variables, and various factors affecting China's GDP. The coefficient estimate for "L(lnINF, 1)" indicates a long-term negative association between the natural logarithm of inflation and the dependent variable, suggesting that as inflation increases in the long run, the dependent variable decreases. Conversely, the coefficient estimate for "d(L(lnINF, 1))" shows a short-term positive relationship, implying that when there is a change in inflation in the short term, the dependent variable tends to increase. The coefficient estimate for "d(lnINF)" is not significant, suggesting that high and persistent inflation can negatively impact the overall economy. Additionally, GCF and INF are significant factors both in the long and short term, while FLFP and MLFP exhibit significance in the long run and FDI in the short run. Notably, FLFP positively affects China's GDP in the long term, indicating that promoting women's participation in the labor force through education and training can contribute to long-term economic growth. Conversely, MLFP has a negative long-term effect, highlighting the potential negative consequences of reduced male workforce participation due to factors like an aging population or declining industries on China's economic growth.

Restricted Error Correction Models

The purpose of a restricted error correction model (RECM) is to test for a long-run relationship among variables in an error correction model (ECM). The RECM imposes restrictions on ECM coefficients, allowing the testing of the null hypothesis of no long-run relationship against the alternative hypothesis. This approach addresses the issue of spurious regression by ensuring that the long-run relationship is grounded in economic theory or prior empirical evidence, rather than being a statistical coincidence.

Table no9: RECM test results for India

India: Restricted Error Correction Model Summary				
	Estimate	Std. Error	t value	Probability
(Intercept)	-291.632	36.925	-7.898	$1.59x10^{-6}$ ***
d(L(LGDP 1))	0.192	0.129	1.492	0.157
d(LGCF)	2.759	0.501	5.497	$7.859x10^{-5}$ ***
d(L(LGCF 1))	1.082	0.519	2.085	0.055 .
d(L(LGCF 2))	1.887	0.500	3.772	0.002 **
d(LINF)	0.656	0.161	4.051	0.001 **
d(LFLFP)	7.459	3.378	2.208	0.044 *
d(L(LFLFP 1))	15.730	4.606	3.415	0.004 **
d(L(LFLFP 2))	18.449	4.354	4.237	$8.29x10^{-4}$ ***
d(LMLFP)	6.707	16.313	0.411	0.687
d(L(LMLFP 1))	-54.209	17.490	-3.099	0.007 **
d(LFDI)	-0.088	0.100	-0.876	0.396
d(L(LFDI 1))	-0.200	0.112	-1.773	0.097 .
ect	-1.235	0.156	-7.901	$1.58x10^{-6}$ ***
*Note: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*				

In the short term (Table 4.8), LGCF at the current time and at two lags, LINF, LFLFP at current and lagged values, and LMLFP lagged at one time had a notable influence on GDP in India. Except for MLFP, which had a negative relation, all other values had a statistically significant positive relation with GDP. In the model summary, ect stands for "error correction term" which is estimated to be -1.235. The negative value indicates that the adjustment process is toward equilibrium, i.e., when there is a deviation from the long-run relationship, the error correction term will act to bring the variables back to their long-run equilibrium relationship. The ect coefficient in the model is both negative and significant, indicating that when there is a deviation from the long-run relationship between LGDP and the independent variables, the error correction term will act to bring the variables back to their equilibrium level. Specifically, if LGDP is above its long-run equilibrium level, it will decrease by approximately 1.24% per period until it returns to equilibrium. Conversely, if LGDP is below its long-run equilibrium level, it will increase by about 1.24% each period until it returns to its equilibrium level.

Table no10: RECM test results for China

China: Restricted Error Correction Model Summary				
	Estimate	Std. Error	t value	Probability
(Intercept)	104.252	16.121	6.467	$1.481x10^{-5}$ ***
d(L(lnGDP 1))	-0.736	0.134	-5.476	$8.170x10^{-5}$ ***
d(lnGCF)	0.747	0.737	1.014	0.327
d(L(lnGCF 1))	-4.804	0.695	-6.909	$7.22x10^{-6}$ ***
d(L(lnGCF 2))	-2.107	0.671	-3.141	0.007 **
d(lnINF)	-0.093	0.040	-2.288	0.038*
d(L(lnINF 1))	0.203	0.037	5.486	$8.015x10^{-5}$***
d(lnFLFP)	-88.423	13.503	-6.548	1.295×10^{-5} ***
d(lnMLFP)	39.057	23.876	1.636	0.124
d(L(lnMLFP 1))	72.385	20.022	3.615	0.002 **
d(lnFDI)	0.188	0.047	3.956	0.001 **
d(L(lnFDI 1))	0.104	0.049	2.122	0.052 .
d(L(lnFDI 2))	-0.186	0.044	-4.180	$9.25x10^{-4}$ ***
ect	-0.430	0.066	-6.487	$1.432x10^{-5}$ ***
*Note: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*				

The results in the Table 10 indicate that several independent variables have a statistically significant short-term relationship with lnGDP. The first lag of lnGCF (L(lnGCF, 1)) and lnFLFP have negative relationships with lnGDP while lnFDI has a positive relationship with lnGDP. The error correction term (ect) is also statistically significant and negative, suggesting that any deviation from the long-run equilibrium relationship between lnGDP and the independent variables is corrected by about 0.43% each period. The model has an adjusted R-squared value of 0.941 (Table 4.10), indicating that it explains about 94% of the variation in lnGDP. The F-statistic is 34.32 and its associated p-value is very small (<0.001), indicating that overall, the model is statistically significant.

Diagnostic Tests

Since the unrestricted and restricted ECMs are based on the ARDL model we have run the diagnostic testing on ARDL model likewise. Here are the results for the same.

Table no11: Diagnostic Test Results

	India		China	
	Test statistic	p-value	Test statistic	p- value
Durbin-Watson test	2.127	0.199	2.806	0.515
Breusch-Pagan test	10.676	0.872	19.379	0.368
JarqueBera Test	3.2723	0.194	0.691	0.707
RESET test	2.9851	0.107	4.254	0.061

To ensure the validity and reliability of an ARDL model, several diagnostic tests were conducted. These included the Durbin-Watson test to check for autocorrelation, the Breusch-Pagan test to test for heteroscedasticity, the Jarque-Bera test to test for normality, and the Ramsey RESET test to test for omitted variables. Significant results in any of these tests could indicate issues with the model, and these tests were used to confirm the accuracy and usefulness of the model and its results. For both India and china, the Durbin-Watson test and the Breusch-Pagan test indicate that the assumptions of no autocorrelation and homoscedasticity are met, respectively. The Jarque-Bera test and the RESET test suggest that the residuals of the model are normally distributed and there is no specification error.

Granger Causality Test

Table no11: Granger Causality test Results

Country	Null Hypothesis	F- Statistics	Probability
India	GCF does not Granger Cause GDP	0.011	0.915
	GDP does not Granger Cause GCF	0.072	0.789
	INF does not Granger Cause GDP	0.333	0.568
	GDP does not Granger Cause INF	2.367	0.135
	FLFP does not Granger Cause GDP	0.286	0.596
	GDP does not Granger Cause FLFP	1.506	0.230
	MLFP does not Granger Cause GDP	0.279	0.601
	GDP does not Granger Cause MLFP	3.938	0.057*
	FDI does not Granger Cause GDP	0.958	0.336
	GDP does not Granger Cause FDI	0.106	0.746
China	GCF does not Granger Cause GDP	1.083	0.307
	GDP does not Granger Cause GCF	1.370	0.251
	INF does not Granger Cause GDP	0.003	0.952
	GDP does not Granger Cause INF	6.607	0.015*
	FLFP does not Granger Cause GDP	3.464	0.073
	GDP does not Granger Cause FLFP	1.152	0.292
	MLFP does not Granger Cause GDP	2.571	0.120
	GDP does not Granger Cause MLFP	0.025	0.873
	FDI does not Granger Cause GDP	1.298	0.264
	GDP does not Granger Cause FDI	0.427	0.518

The results of the Granger causality test (Table 4.12) indicate that in the case of India, none of the variables tested have a Granger causal relationship with GDP, and GDP does not have a Granger causal relationship with any of the variables, except for MLFP. The p-value associated with MLFP is 0.057, which implies a weak indication of causality. Regarding China, the results reveal that GCF does not have a Granger causal relationship with GDP, and vice versa. Furthermore, the p-value for INF is 0.015, suggesting a strong indication of causality, which implies that GDP Granger causes INF in China. Which suggests presence of uni-directional causality between GDP and Inflation in China which runs from GDP to Inflation. The remaining variables, including FLFP, MLFP, and FDI, do not have a statistically significant causal relationship with GDP. It is crucial to keep in mind that the outcomes of the Granger causality test do not provide conclusive evidence of causality but only suggest the possibility of a causal relationship between the variables being analyzed. Policymakers may consider inflation targeting, adjusting monetary policy, fiscal policy, and implementing macro prudential policies to manage inflation-related risks in the economy. The strong causal relationship between INF and GDP in China highlights the need for policymakers to pay close attention to inflation levels and implement policies to manage inflation-related risks in the economy.

VII.CONCLUSION

This research aimed to explore the relationship between GDP and inflation in India and China, two of the world's largest and fastest-growing economies. The study utilized time-series data from the World Development Indicators database for the period of 1991 to 2021 and selected independent variables such as gross capital formation, inflation, female labor force participation, male labor force participation, and foreign direct investment. The findings of this study revealed that there is a short-term positive relationship between GDP and inflation in India, while in China, there is a short-term positive and a long-term negative relationship between the two variables. This suggests that high and persistent inflation can have a negative impact on the overall economy. Inflation has a negative relationship with GDP in the long run, but not in the short run, suggests that in the long run, sustained periods of high inflation can be detrimental to economic growth. Additionally, the study found that there is no causal relationship between GDP and inflation in India, while in China, the causality runs from GDP to inflation in a unidirectional manner. In the case of India, the short-term positive relationship between GDP and inflation highlights the need for policymakers to carefully monitor inflation rates, particularly during times of economic growth, as it could potentially lead to economic instability. To ensure sustainable economic growth, policymakers in India may need to adopt measures that balance the need for economic expansion with the need to maintain inflation within a manageable range. In contrast, the short-term positive and long-term negative relationship between GDP and inflation in China suggests that policymakers may need to focus on long-term strategies to manage inflation and maintain sustainable economic growth. This may include implementing policies that promote stable and sustainable economic growth, while also taking steps to address inflationary pressures. Furthermore, the unidirectional causality from GDP to inflation in China implies that policymakers should prioritize strategies that promote economic growth as a means of managing inflation. This may include measures such as promoting investment in key sectors of the economy, increasing productivity, and fostering innovation.

References

1. *Mallik, G., & Chowdhury, A. (2001). Inflation and economic growth: Evidence from four South Asian countries. Asia-Pacific Development Journal, 8(1), 123-135.*
2. *Manamperi, N. (2014). The short and long-run dynamics between inflation and economic growth in BRICS. Applied Economics Letters, 21(2), 140-145.*
3. *Barro, R. J. (1995). Inflation and growth. Federal Reserve Bank of St. Louis Review, 77(6), 153-166.*
4. *Nguyen, H. T. (2021). Relationship between inflation and economic growth in Vietnam. Turkish Journal of Computer and Mathematics Education, 12(14), 5134-5139.*
5. *Khan, M. S., &Senhadji, A. S. (2001). Threshold effects in the relationship between inflation and growth. IMF Staff Papers, 48(1), 1-21.*
6. *Pattanaik, S., &Nadhanael, G. V. (2013). Why persistent high inflation impedes growth? An empirical assessment of threshold level of inflation for India. Macroeconomics and Finance in Emerging Market Economies, 6(2), 204-219.*
7. *Hodge, D. (2006). Inflation and growth in South Africa. Cambridge Journal of Economics, 30(2), 163-180.*
8. *Bruno, M., & Easterly, W. (1996). Inflation and Growth: In Search of a Stable Relationship. Federal Reserve Bank of St. Louis Review, 78(3), 8-17.*
9. *Saungweme, T., & Odhiambo, N. M. (2021). Inflation and economic growth in Kenya: An empirical examination. Unisa Economic Research Working Paper Series. Working Paper 24/2021. Advances in Decision Sciences (ADS).*
10. *Uddin, I. (2021). Impact of inflation on economic growth in Pakistan. Economic consultant, 34 (2), 33-41.*
11. *Ahmmed, M., Uddin, M. N., Rafiq, M. R. I., & Uddin, M. J. (2020). Inflation and Economic Growth Link – Multi-Country Scenario. International Journal of Economics and Financial Issues, 10(44), 47-53*
12. *Saaed, A. A. J. (2007). Inflation and economic growth in Kuwait: 1985-2005 evidence from co-integration and error correction model. Applied Econometrics and International Development, 7(1).*
13. *Singh, K., &Kalirajan, K. (2003). The inflation-growth nexus in India: An empirical analysis. Journal of Policy Modeling, 25, 377-396.*
14. *Jha, R., & Dang, T. N. (2012). Inflation variability and the relationship between inflation and growth. Macroeconomics and Finance in Emerging Market Economies, 5(1), 1-15.*
15. *Ghosh, A., & Phillips, S. (1998). Warning: Inflation may be harmful to your growth. Staff Papers (International Monetary Fund), 45(4), 672-710.*
16. *Mandeya, S. M. T., &Ho, S-Y. (2021). Inflation, inflation uncertainty and the economic growth nexus: An impact study of South Africa. Economic Analysis and Policy, 70, 91-104.*
17. *Onwubuariri, S. E. (2021). Inflation and economic growth in Nigeria: An ARDL bound testing approach. Sapientia Foundation Journal of Education, Sciences and Gender Studies (SFJESGS), 3(1), 277-290.*
18. *Salamai, A. A., Faisal, S. M., & Khan, A. K. (2022). The relationship between inflation and GDP with reference to oil-based economy. International Journal of Multidisciplinary Research and Growth Evaluation, 03(01), 375-380.*
19. *Karahan, Ö.,&Çolak, O. (2018). Inflation and Economic Growth in Turkey: Evidence from a Nonlinear ARDL Approach. International Journal of Economics and Financial Issues, 8(1), 245-251.*
20. *Kormendi, R. C., & McGuire, P. G. (1985). Macroeconomic determinants of growth: Cross-country evidence. Journal of Monetary Economics, 16, 141-163.*
21. *Ball, L., Chari, A., & Mishra, P. (2016). Understanding inflation in India (NBER Working Paper No. 22948). National Bureau of Economic Research.*