

Impact of Selected Macroeconomic Factors on Growth: Some Facts and Fictions in India

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ABSTRACT

The pace and trajectory of a country's growth of economy are influenced by various aspects that fall under the umbrella of macroeconomic determinants. A comprehensive analysis of various macroeconomic determinants is required to assess an economy's strength. These determinants have been tested empirically and can determine the degree of a nation's economic performance. The present research intends to assess the effect of selected macroeconomic determinants on India's economic growth, including inflation, FDI, exports, interest rates, imports, exchange rates, development assistance, and capital formation. The analysis utilized a comprehensive set of time-series data covering 1990 to 2021, which better understands different aspects of an economy's growth and identifies the key drivers of development. The research offers valuable insight into the factors that contribute to India's economic growth, which can be useful for policymakers, investors, and researchers alike.

Keywords: India; ARDL; Economic Growth; Exchange Rate; FDI; Inflation

Manuscript Received: September 12, 2024; Revised Manuscript Received: December 16, 2024,

Accepted: January 7 2025

1. INTRODUCTION

Economic growth has been a central focus of human civilization for centuries. A nation's GDP growth rate has a substantial impression on its overall development and progress. Assessing the strength of an economy requires a comprehensive analysis of various macroeconomic determinants, which have been empirically tested and can be used to assess a nation's economic performance. By examining factors such as foreign direct investment, inflation, rate of interest, exports, imports, exchange rates, development assistance, and capital formation, the study can gain a better understanding of how an economy is functioning and identify areas that need improvement.

In emerging countries like India, FDI is essential for fostering the economy's growth. A study by Gregorio and Lee in 1998 found that, when it comes to boosting economic growth, foreign direct investment packs a stronger punch than domestic investment. Its influence can reshape economies and drive progress in ways that local investments often cannot match. It serves as a primary conduit for technology transfer. It is vital to understand that the benefits of foreign investments can only be fully achieved if the country receiving the investment has a basic level of skilled workers and education. In other words, a host economy's capacity to adopt new technologies is a crucial factor in

the effectiveness of FDI in fostering the economy's growth. FDI can be a strong driver of economic development. However, it must be managed carefully to ensure that the host economy possesses the necessary skills and infrastructure to fully benefit from the new technologies being introduced.

Macroeconomics studies how inflation affects growth of economy, productivity, and output. The money and growth literature has developed models that analyze this topic. These models focus on the steady-state equilibrium of capital per capita and output. Inflation influences output and capital per capita, as explored by Orphanides and Solow (1990). They disclosed that inflation significantly affects the macroeconomic landscape. Furthermore, cutting budget deficits and controlling inflation have led to economic growth in Latin America, especially in Chile and Mexico as observed by Fischer (1993).

There are two main ideas about how inflation and economic growth are related. Mundell in 1963 and Tobin in 1965 argued that high inflation surges the cost of holding money, leading to shifting capital from money to investment portfolios, ultimately improving economic growth. However, a rise in inflation can also slow economic growth. High inflation increases the cost of capital, which reduces investment rates and the rate of capital accumulation. This fall in capital accumulation leads to a fall in the real growth rate. High inflation also reassures inflation tax to rise, reducing work incentives and ultimately increasing unemployment. As a result, high unemployment not only reduces real output but also declines growth in the economy.

International trade is a decisive aspect of growth in the economy. When countries buy and sell things to each other, it helps them grow and improve, which leads to greater development and progress for everyone involved. Policymakers and scholars have shown a strong interest in investigating the potential connection between international trade and economic growth. Piana (2001) notes that when a country intensifies its exports, the levels of production, GDP, and employment also increase. However, imports significantly contribute to establishing a "virtuous" link between trade and output growth. By importing necessary inputs and technology, a country can improve its production capabilities, which can lead to increased economic output contended by Thangavelu and Rajaguru (2004).

Capital formation and economic growth are closely connected processes that reinforce each other. Investments in both physical and human capital drive economic growth. In turn, sustained growth fosters conditions that promote further capital accumulation. Policymakers often focus on creating an environment that encourages both capital formation and economic growth to achieve long-term development objectives. Both the growth of physical resources, like buildings and machinery and the development of people's skills and knowledge play important roles in helping the economy grow, according to studies conducted by (Maria & Stryszowski, 2009; Sahoo, 2012).

This study examines the effect of macroeconomic factors such as FDI, inflation, rate of interest, exports, and imports on the Indian economy. The paper continues with

the section following the Review of Literature. This next section presents the data, study variables, econometric analysis, and methodology used in the research. The study concludes with a summary of the whole work. The goal is to explore how different large-scale economic factors affect India's economy. The study looks into how various factors influence India's financial performance, whether helpful or harmful. By rigorously examining key economic indicators such as GDP, FDI, inflation, interest rates, exports, imports, exchange rates, development assistance, and capital formation, this study seeks to deliver a complete understanding of the complex connection among macroeconomic variables and economic growth in India.

2. LITERATURE REVIEW

In recent decades, many studies have looked at how macroeconomic factors influence growth in the economy. One study by Das and Das (2020) shows that trade openness affects GDP. Another study by Gupta et al. (2022) found that factors like financial development, trade openness, technological skills, and institutional quality significantly influence the bond between FDI and economy's growth, even if their effect is indirect. Verma and Saluja (2018) conducted a research study that explored how foreign investment stimulates technology inflow, enhances sector competitiveness, and creates economic activity and employment opportunities. According to the Planning Commission, foreign direct investment (FDI) is preferred over other forms of external funding because it does not create debt, is stable, and its performance is tied to the projects it supports, as emphasized by Singh (2019).

A research work by Sultana et al. (2019) investigated the influence of FDI on key factors in India's economy, including population, the HDI, and the Sensex index. Their findings revealed that FDI significantly influenced HDI, population dynamics, and the Sensex, with a moderate impact on imports and exports. In a follow-up study in 2020, Fonseka and Singh analyzed the relationship between FDI and India's Gross Domestic Product (GDP). Using a regression model, they found that changes in FDI accounted for about 90% of the variations in GDP, highlighting its critical role in the economy. Their research also showed a strong positive correlation between increased FDI and growth of economy, suggesting that boosting foreign investment can enhance India's overall prosperity.

According to the study conducted by Mishra & Kumar in 2016, Foreign direct investment significantly contributes to the economic development of evolving nations by facilitating knowledge transfer and providing financing. Multinational corporations view foreign direct investment as an essential tool in restructuring cross-border manufacturing activities to meet their corporate goals and leverage the competitive advantages of the host country. Moreover, FDI positively impacts products, especially in high-income countries. However, this effect is neither uniform nor significant in upper-middle-income countries as per the research conducted by Alvares et al. (2017).

In a study conducted by Gupta & Shastri (2020), the relationship between public expenditure and India's growth of the economy from 1980-2015 was examined using several statistical models such as ADF, PP unit root test, and vector autoregression. The study found that government expenditures positively impacted India's economic progress. Similarly, trade openness and human capital development significantly positively influence economic progress in Asian nations. However, the study also showed that the labor force's participation negatively affected economic progress in these countries, Amna Intisar et al. (2020).

In 2017, Simionescu et al. conducted a study to detect the key influencers that influenced the evolution of the economy of the V4 nations between 2003 and 2016. Using the Bayesian regression model, the research found that foreign direct investment and spending on research and development are vital for growth in all the countries studied. In a similar context, the result of FDI on the economy's growth from 1990 to 2015, utilizing the vector error correction model examined by Reza et al. (2018).

3. ECONOMETRIC MODEL METHODOLOGY

Data description and sources

This study evaluates how certain macroeconomic factors affect growth in the economy. It uses the ARDL bounds testing method and analyzes a complete set of time series data covering 1990 to 2021. The model looks at the overall economic output of a country i.e., GDP, measured in constant 2015 US dollars, to see how it is affected by other factors. In this case, the economic output is the focus, while all the other factors are considered to help explain how it changes. This means that GDP is used as a sign of a developed country, while the other variables are used to explain the factors that influence this development. The explanatory variable FDI refers to the total amount of foreign direct investments flowing into India, measured in US dollars. Additionally, this variable highlights the potential trade opportunities available in the country. The exports and imports are calculated at constant 2015 US\$, Chirwa & Odhiambo, 2017. Do not forget to consider how inflation can shape GDP growth. It is an important factor that can significantly influence the overall economic landscape! The use of WPI to denote the Wholesale Price Index (2010 = 100), which is used as a proxy for inflation. Burnside and Dollar (2000) have suggested in their study that the inflation rate represents a country's monetary policy. EXCH stands for the exchange rate, which is a way to measure how much one country's money is worth compared to another's. This rate can help us understand how stable or unpredictable trade between countries might be, Ilhan, 2006 (LCU per US\$, period average). ODA stands for official development assistance, which refers to the financial help that countries receive to support their development goals. This assistance is measured in a way that keeps its value consistent over time, using the purchasing power of money in the year 2020 as a standard. Finally, GCF represents the gross capital formation measured at constant 2015 US\$.

4. ECONOMETRIC MODEL SPECIFICATION

This study looks at how various factors influence economic growth in India. It seeks to understand these relationships by building on previous research to provide a clearer picture of the economy. The analysis references extensive research conducted by scholars such as Fischer in 1993, Anyanwu in 2014, Bal, Dash, and Subhashish in 2016, Chirwa and Odhiambo in 2017, Kryeziu in 2016, and Mbulawa in 2015. The resulting equation, which investigates the factors influencing GDP growth, is presented below in its functional form.

$$GDP_t = f(FDI_t, WPI_t, EXP_t, IMP_t, EXCH_t, ODA_t, GCF_t) \quad (1)$$

Equation (1) combines several important economic factors. These include: Real Growth of Domestic Product (GDP); Foreign Direct Investment (FDI); Exchange Rate (EXCH); Wholesale Price Index (WPI); Export (EXP); Import (IMP); Official Development Assistance (ODA); and Gross Capital Formation (GCF).

To make the variables more easily interpretable, they have been transformed into their natural logarithm form. Hence, the model is formulated in the following log-linear form with intercept β_0 and all other coefficients $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and β_7 corresponding to their respective explanatory variables, bearing their specific interpretations.

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$$\ln GDP_t = \beta_0 + \beta_1 \ln FDI_t + \beta_2 \ln WPI_t + \beta_3 \ln EXP_t + \beta_4 \ln IMP_t + \beta_5 \ln EXCH_t + \beta_6 \ln ODA_t + \beta_7 \ln GCF_t + \varepsilon_t \quad (2)$$

The log-linear ARDL model based on Equation (2) can be stated as follows,

$$\begin{aligned} \ln GDP_t = & \phi_0 + \sum_{i=1}^p \phi_{1i} \ln GDP_{t-i} + \sum_{i=0}^p \phi_{2i} \ln FDI_{t-i} + \sum_{i=0}^p \phi_{3i} \ln WPI_{t-i} + \sum_{i=0}^p \phi_{4i} \ln EXP_{t-i} \\ & + \sum_{i=0}^p \phi_{5i} \ln IMP_{t-i} + \sum_{i=0}^p \phi_{6i} \ln EXCH_{t-i} + \sum_{i=0}^p \phi_{7i} \ln ODA_{t-i} \\ & + \sum_{i=0}^p \phi_{8i} \ln GCF_{t-i} + \varepsilon_t \end{aligned} \quad (3)$$

The article explores how different factors are related to each other over both short and long periods. It uses a method known as the ARDL approach to help explain these connections between the main ideas, allowing for a clearer understanding of their relationships. The ARDL bounds test method offers some benefits compared to more traditional ways of analyzing co-integration. M. Pesaran & B. Pesaran, in 1997 stated that it can be used even when the variables have different orders of integration. Then the model uses past data points to create a step-by-step approach that starts with a broad perspective and becomes more focused, according to Laurenceson & Chai (2003). The ARDL model stands out from other methods because it can identify long-term relationships between variables using one simple equation. This approach makes it easier to understand how different factors influence each other over time, as noted by Shrestha and Chowdhury in 2007. The error correction model (ECM) effectively combines short-run dynamics with long-run relationships without losing sight of long-term evidence. In this study, we examine a combination of variables that exhibit both $I(0)$ and $I(1)$ orders. ADF test conducted to check if there is a repeated pattern in the data over time. Additionally, the PP unit root test has been conducted to examine the overall movement and trends in the data series. Hence, the ARDL bound estimation model can be represented mathematically with notational specifications.

$$\begin{aligned}
 \Delta \ln GDP_t = & \phi_0 + \sum_{i=1}^p \phi_{1i} \Delta \ln GDP_{t-i} + \sum_{i=0}^p \phi_{2i} \Delta \ln FDI_{t-i} + \sum_{i=0}^p \phi_{3i} \Delta \ln WPI_{t-i} \\
 & + \sum_{i=0}^p \phi_{4i} \Delta \ln EXP_{t-i} + \sum_{i=0}^p \phi_{5i} \Delta \ln IMP_{t-i} + \sum_{i=0}^p \phi_{6i} \Delta \ln EXCH_{t-i} \\
 & + \sum_{i=0}^p \phi_{7i} \Delta \ln ODA_{t-i} + \sum_{i=0}^p \phi_{8i} \Delta \ln GCF_{t-i} + \phi_1 \ln GDP_{t-1} + \phi_2 \ln FDI_{t-1} \\
 & + \phi_3 \ln WPI_{t-1} + \phi_4 \ln EXP_{t-1} + \phi_5 \ln IMP_{t-1} + \phi_6 \ln EXCH_{t-1} \\
 & + \phi_7 \ln ODA_{t-1} + \phi_8 \ln GCF_{t-1} + \varepsilon_t
 \end{aligned} \tag{4}$$

The symbol Δ is typically used to represent the first difference in statistical analysis. The parameters that correspond to differenced lagged variables are known as short-run parameters, while those associated with lagged variables at levels are referred to as long-run parameters. The selection of an optimal lag order is often determined using information criteria such as the Akaike and Schwartz criteria. The study relied on the Akaike Information Criteria as a suitable criterion for selecting the appropriate lag order.

The Wald F statistic is used to evaluate the null hypothesis, suggesting that there is no cointegration between the regressors and the regressand. This assessment is made in comparison to the alternative hypothesis, which argues that these variables do indeed exhibit cointegration.

The hypothesis can be expressed in the following manner,

$$H_0: \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = \varphi_5 = \varphi_6 = \varphi_7 = \varphi_8 = 0 \quad (5)$$

$$H_1: \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq \varphi_5 \neq \varphi_6 \neq \varphi_7 \neq \varphi_8 \neq 0 \quad (6)$$

To assess the Wald F statistic, it must be compared against two critical bound values: the lower bound critical value $I(0)$ and the upper bound critical value $I(1)$. These values categorize the predictor variables into three distinct groups: purely $I(0)$, purely $I(1)$, or those that are mutually cointegrated. If the F statistic exceeds the upper bound value, the null hypothesis cannot be accepted, suggesting the presence of a long-run relationship. On the other hand, if the F statistic falls below the lower bound, it indicates that no such long-run relationship exists.

Upon confirming the existence of a long-term cointegration relationship, the subsequent step is to analyze the short-run dynamics of that relationship. This can be accomplished through the application of ECM, which necessitates the incorporation of a first-order lagged error correction term. The regression equation can consequently be articulated as follows:

$$\begin{aligned} \Delta \ln GDP_t = & \varphi_0 + \sum_{i=1}^p \varphi_{1i} \Delta \ln GDP_{t-i} + \sum_{i=0}^p \varphi_{2i} \Delta \ln FDI_{t-i} + \sum_{i=0}^p \varphi_{3i} \Delta \ln WPI_{t-i} \\ & + \sum_{i=0}^p \varphi_{4i} \Delta \ln EXP_{t-i} + \sum_{i=0}^p \varphi_{5i} \Delta \ln IMP_{t-i} + \sum_{i=0}^p \varphi_{6i} \Delta \ln EXCH_{t-i} \\ & + \sum_{i=0}^p \varphi_{7i} \Delta \ln ODA_{t-i} + \sum_{i=0}^p \varphi_{8i} \Delta \ln GCF_{t-i} + \vartheta ECT_{t-1} + \varepsilon_t \end{aligned} \quad (7)$$

Where, ϑ is the coefficient associated with lagged ECT reflects the speed at which short-run shocks adjust back towards long-run equilibrium.

Empirics

Visual representations presented below provide a detailed analysis of the trends observed in all the variables that were subjected to scrutiny in the study. It is evident from the graphs that each variable has shown a consistent upward trend over the years. However, a noticeable dip was observed in the year 2020, which can be attributed to the unprecedented effect of the COVID-19 pandemic on the global economy. Despite this temporary setback, the overall pattern suggests a positive long-term outlook for the variables analysed.

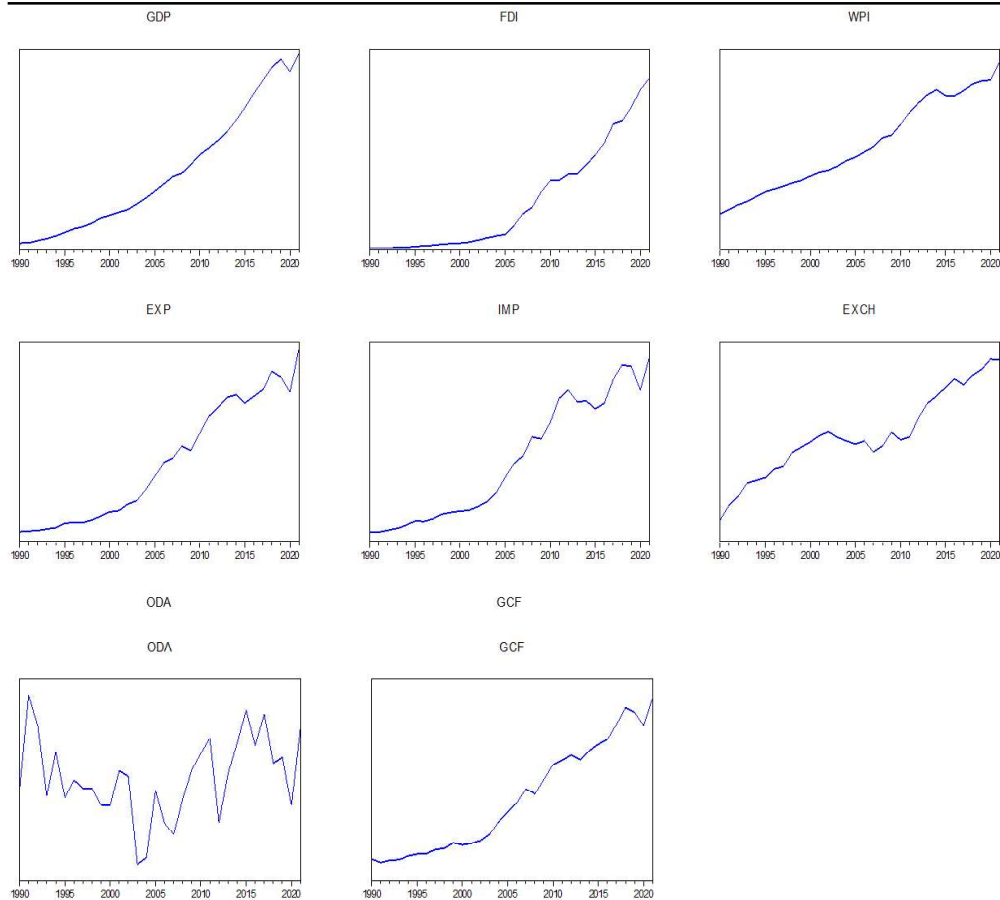


Figure 1: Graphical Analysis of Trends of the Variables

Unit Root and ARDL Bound Cointegration Test

Non-stationarity of variables is a common problem when dealing with time series data that have unit root(s). This can lead to biased inferences, which can be avoided by conducting ADF and PP unit root tests to determine the variables' stationarity. The null hypotheses of these tests check for the occurrence of unit root, while the alternatives recommend others. If the t statistic exceeds the corresponding critical t value, the null hypothesis is rejected, and the alternative hypothesis is accepted. This outcome indicates the presence of a unit root in the data. The findings of both the ADF and PP unit root tests, as presented in Table 1, demonstrate the results for both level and first difference unit root assessments.

Table 1: Unit Roots Tests[©]

Variables	Augmented Dickey-Fuller		Phillips–Perron	
	Level		Level	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
InGDP	-0.2202	-2.6881	-0.2191	2.8209
InFDI	-2.4626	-0.0188	-2.1688	-0.3123
InWPI	-3.4010**	-2.5685	-3.0190**	-2.5316
InEXP	-1.6711	-0.6492	-1.7636	-0.6339
InIMP	-2.0344	-0.6616	-1.9960	-0.7542
InEXCH	-3.7762***	-2.2901	-3.2390**	-3.9828**
InODA	-3.3523**	-3.3644*	-3.3721**	-3.3644*
InGCF	-0.3854	-1.8695	-0.3782	-2.0760

Variables	At First Difference		At First Difference	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
InGDP	-5.3831***	-5.3588***	-5.4377***	-5.4230***
InFDI	-3.1192**	-3.9853**	-3.1975**	-3.9853**
InWPI	-3.5522**	-3.4938*	-3.5053**	-3.4432*
InEXP	-4.5976***	-4.9389***	-4.5976***	-4.8457***
InIMP	-4.2200***	-4.8862***	-4.2477***	-4.8744***
InEXCH	-4.9823***	-4.9473***	-5.0817***	-4.9834***
InODA	-6.4634***	-6.5025***	-11.0790***	-14.9619***
InGCF	-6.3909***	-6.4810***	-6.3596***	-6.4810***

Note: *p<0.1; **p<0.05; ***p<0.01

©Author's calculation

Table 1 presents the results of tests used to check whether certain economic indicators show consistent patterns over time. The indicators examined include GDP, FDI, EXP, IMP, and GCF. Initially, these indicators do not show stable behaviour, meaning they can fluctuate widely. However, after adjusting the data either by looking at their original values or making small changes, these indicators show more stability. This finding suggests that it is possible to explore how these variables might be connected over the long term using specific testing methods.

Once you have verified that there isn't a long-term trend affecting the data, the next step is to check whether the variables have a stable long-term relationship with each other. The process involves selecting the best lag model and using equation (4) to find the Wald F statistics. The regression analysis indicates that there is long-run cointegration among the variables. The results of the cointegration bound test are presented in Table 2, which shows the Wald F statistic alongside the critical values at the 1%, 5%, and 10% significance levels. This information is crucial in determining the long-term associations among the variables and can aid in making informed decisions.

Table 2: *F*-Bounds Cointegration Test[©]

Model: $\ln GDP_t = f(\ln FDI_t, \ln WPI_t, \ln EXP_t, \ln IMP_t, \ln EXCH_t, \ln ODA_t, \ln GCF_t)$				
Test Statistic	Value	Significance	I (0)	(1)
<i>F</i> -Statistic	4.8423***	10 %	2.03	3.13
		5 %	2.32	3.50
		1 %	2.96	4.26

“***” shows the significance level at 1 %

©Author's own calculation

Looking at the data in Table 2, we find that a specific measure, known as the Wald F statistic, is higher than the critical values we look for at three key significance levels: 1%, 5%, and 10%. This means the null hypothesis cannot be accepted and instead support the alternative assumption. In simpler terms, this indicates that there is a long-term relationship between the variables involved. Specifically, the variables tied to $\ln FDI$, $\ln WPI$, $\ln EXP$, $\ln IMP$, $\ln EXCH$, $\ln ODA$, and $\ln GCF$ all show a lasting connection with $\ln GDP$.

ARDL Long Run Coefficient Elasticities

After establishing that there is a stable long-term relationship between the variables, we can calculate how changes in each variable affect the others over time using an estimable equation (4). Here, only present the estimated long-run coefficient elasticities to avoid the gratuitous clumsiness of the result. The results shown in the table suggest a strong manifest long-run cointegration of most of the predictors with the regressand. The variables FDI , WPI , and ODA have a positive impact on the gross domestic product but the result is statistically insignificant. Whereas, other variables such as EXP , $EXCH$, and GCF have a positive and significant effect on GDP . Furthermore, IMP has a negative

and significant effect on GDP, such that a 1% fall in imports can increase the GDP by 0.66%.

It was discovered through the analysis presented in Table 3 that the GDP is positively influenced by FDI and development assistance. However, the impact was found to be insignificant. This suggests that bringing in more resources and tools for production in an emerging country like India could lead to lasting growth of the economy over time (Chakraborty & Mukherjee, 2012).

Table 3: Long-run Coefficient Elasticities[©]

Variable	Coefficient	Std. Error	t-Statistic
Constant	11.6290***	3.8508	3.0198
lnFDI	0.07627	0.0459	1.6599
lnWPI	0.1345	0.1539	0.8742
lnEXP	0.1391*	0.0642	2.1662
lnIMP	-0.6612***	0.1072	-6.1639
lnEXCH	0.7758***	0.1214	6.3879
lnODA	0.0433	0.0257	1.6869
lnGCF	0.9244***	0.0651	14.2006

[©]Author's own calculation

Note: *p<0.1; **p<0.05; ***p<0.01

According to the analysis, the data indicates that inflation has a favourable influence on economic growth. As highlighted by influential economists Mundell and Tobin, high inflation makes holding onto cash more burdensome. This situation prompts a shift, as individuals and businesses reallocate their funds from mere savings to investments. Such a transition fuels economic growth and creates opportunities for innovation and expansion, benefiting everyone in the long run.

Trade among countries, exports, and imports, is very important for a nation's economy. This trade can greatly influence the overall wealth and growth of the country. However, their impact is not the same. While export has a positive impact on GDP, import has a negative impact. A study by Ghoshal in 2015 highlighted that when looking at how open trade affects economic growth, it is important to look at exports and imports separately. This helps us understand their roles in the economy better. Therefore, it is crucial to understand the dynamics of exports and imports to better evaluate their influence on the GDP of a country.

The interdependence between the exchange rate and GDP in India reveals that fluctuations in exchange rates lead to a positive impact on the growth of the country's GDP. The long-term positive correlation between these two variables indicates that exchange rate fluctuations play a crucial role in influencing the overall economic growth

of India. It is an economic shock that can be made stable by the influence of other macroeconomic variables.

Investments in physical and human capital have a significant influence on economic growth. Gross capital formation (GCF) is a measure of these investments, and it has been found that a 1% increase in GCF can increase GDP by 0.92%. This means that sustained economic growth is dependent on the accumulation of capital, which in turn creates the conditions for further investment. Therefore, it is essential to prioritize investments in physical and human capital to drive economic growth and achieve long-term prosperity.

ARDL Short Run Dynamic Effect & ECM

Based on the AIC, an Autoregressive Distributed Lag (ARDL) model has been constructed utilizing a lag setup of 2, 2, 2, 2, 1, 2, 2, and 2. The process of examining the long-term relationship between variables, known as cointegration, is crucial in econometric analysis. Once this has been established, the short-run dynamic effects and ECT can be determined. In this regard, the estimation results obtained by regressing equation (7) have been provided in the appendix section. To better understand the results, a portion of the data has been presented in Table 4, focusing solely on the short-run coefficients and coefficients corresponding to lagged ECT. The table shows that both foreign direct investment (FDI) from this year and last year have a strong positive effect on the country's GDP, with results that are very reliable. Similarly, inflation rates from this year and last year also positively influence GDP, again at a reliable level.

Table 4: Short-run Dynamic Effect & Error Correction®

Selected Model: ARDL(2, 2, 2, 2, 1, 2, 2, 1)				
Variable	Coefficient	Std.	Error-S	tatistic
$\Delta \ln GDP_t$	0.5213***	0.1044	4.9898	
$\Delta \ln FDI_t$	0.1202***	0.0257	4.6726	
$\Delta \ln FDI_{t-1}$	0.2183***	0.0320	6.8214	
$\Delta \ln WPI_t$	0.7940***	0.1499	5.2955	
$\Delta \ln WPI_{t-1}$	0.5079***	0.1441	3.5239	
$\Delta \ln EXP_t$	-0.1250**	0.0438	-2.8509	
$\Delta \ln EXP_{t-1}$	0.1704***	0.0345	4.9384	
$\Delta \ln IMP_t$	-0.0535	0.0390	-1.3699	
$\Delta \ln EXCH_t$	1.1057***	0.1232	8.9707	
$\Delta \ln EXCH_{t-1}$	0.2684***	0.0433	6.1983	
$\Delta \ln ODA_t$	0.0170**	0.0055	3.0710	
$\Delta \ln ODA_{t-1}$	-0.0127*	0.0063	-1.9994	
$\Delta \ln GCF_t$	0.5030***	0.0487	10.3206	
ECT_{t-1}	-1.0196***	0.1196	-8.5226	

R^2	0.925
Adjusted R^2	0.855
F -Statistic	13.306***
Durbin-Watson Statistic	2.24
Note: * $p < 0.1$; ** $p < 0.05$;	

*** $p < 0.01$ © Author's own calculation

However, it has been seen that current export hurts GDP at a 5% level, whereas the previous year's exports had a positive impact at a 1% level. The current imports do not seem to affect the overall economy, or GDP, in a meaningful way. However, both the current exchange rate and the exchange rate from the previous year appear to positively influence GDP, with strong evidence indicating this happens at a high level of reliability. Additionally, investments in capital (like buildings, machinery, etc.) also significantly boost GDP. On the other hand, while current foreign aid helps the economy grow, aid received in the previous year seems to have a negative effect. Additionally, ECT a measure of the convergence speed to equilibrium is calculated to be -1.019, which is statistically significant. This means that 101.96% of the short-term disequilibrium in GDP is corrected in the long run by the independent variables. These findings offer important information about how exports, imports, and the overall economy (GDP) are related. This information can help guide decisions that aim to boost economic growth.

After completing the regression analysis, did some follow-up tests to check for two potential issues: uneven variances and correlation. Table 5 displays the statistical values of the BPG, BG LM, and JB Normality tests, which are 0.269, 0.101, and 0.645, respectively. The results indicate that there are no significant problems present in the model that could impact the accuracy of the estimations. Therefore, concluding that the model is reliable and produces valid results.

Table 5 : Diagnostic Tests ©

Test	Statistic	Probability
Breusch-Pagan-Godfrey for Heteroskedasticity	1.5451	0.2699
Breusch- Godfrey LM Test for Serial Correlation	3.4288	0.1016
Jarque-Bera for Normality	0.8745	0.6457
CUSUM	Stable	
© Author's own calculation		

Figure 2: CUSUM Plot

On the basis of CUSUM Plot analysis, conclusion can be made that there is no significant change observed in the dataset observations during the entire time span that

has been considered in the study. This indicates that the coefficients of independent variables remain consistent in the long term, despite the short-term variations.

4. RESULTS

This research employed the Dynamic Ordinary Least Squares (DOLS) and Fully Modified Ordinary Least Squares (FMOLS) methods to confirm the reliability of the ARDL findings. The results from the DOLS analysis are presented in Table 6. In analysing cointegration, the DOLS method is used to address potential endogeneity by incorporating leads and lags of the differenced independent variables. The findings reveal that FDI and EXP have positive effects on GDP, but these effects are not statistically significant. Meanwhile, WPI demonstrates a positive impact on GDP, although it is not statistically significant. On the flip side, IMP has a notable negative impact on the economy's overall growth, represented by GDP. In contrast, EXCH shows a significant positive effect, suggesting that it helps boost the economy, while ODA is marginally significant, suggesting a positive but relatively weaker impact. GCF emerges as the most significant positive factor. Furthermore, the model's R-squared value has increased to 0.996144, indicating a very good fit.

Table 6:DOLS Results for Robustness©

Variables	DOLS		
	Coefficient	Std. Error	t - Statistic
FDI	0.027835	0.049592	0.561278
WPI	0.325495	0.222283	1.464328
EXP	0.028148	0.100092	0.281217
IMP	-0.456092***	0.106731	-4.273297
EXCH	0.351215***	0.107508	3.266883
ODA	0.045611*	0.023811	1.915567
GCF	0.868140***	0.092875	9.347386
C	11.89107***	2.704736	4.396388
R2	0.996144		

Source: ©Author's own calculation

Adjusted R2 0.995019

Note: *p<0.1; **p<0.05; ***p<0.01

The Fully Modified OLS (FMOLS) method is a robust approach used to estimate cointegrating relationships while taking into account issues such as serial correlation and endogeneity. Upon analysing the results, it is observed that the Wholesale Price Index (WPI) exhibits near significance with a positive effect, hinting at a potential impact on Gross Domestic Product (GDP). In contrast, Imports (IMP) display a statistically significant negative effect on GDP. Additionally, both the Exchange Rate (EXCH) and Official Development Assistance (ODA) demonstrate statistically significant positive effects on GDP. Gross Capital Formation (GCF) emerges as the most significant positive factor, characterized by a substantial coefficient. Notably, the model yields a remarkably high R-squared value of 0.995478, signifying that the model explains approximately 99.55% of the variance observed in GDP.

Table 7 : FMOLS Results for Robustness ©

Variables	DOLS		
	Coefficient	Std. Error	t - Statistic
FDI	0.026681	0.042266	0.631265
WPI	0.327454*	0.185347	1.766704
EXP	0.026333	0.083493	0.315393
IMP	-0.517280***	0.096096	-5.382947
EXCH	0.387454***	0.093533	4.142444
ODA	0.048895**	0.020203	2.420190
GCF	0.942977***	0.087086	10.82807
C	11.34624***		2.256054
	5.029243		

Source: ©Author's own calculation

Note: *p<0.1; **p<0.05; ***p<0.01

Table 8:Johansen Cointegration©

	T-value	5% critical value	Prob.
Trace Statistics			
r d" 0	327.9617	159.5297	0.0000***
r d" 1	221.1929	125.6154	0.0000***
r d" 2	153.5974	95.75366	0.0000***
r d" 3	111.7467	69.81889	0.0000***
r d" 4	72.16997	47.85613	0.0001***
r d" 5	38.05504	29.79707	0.0045***
r d" 6	18.83988	15.49471	0.0151**
r d" 7	5.967114	3.841466	0.0146**
Maximum Eigen			
r d" 0	106.7688	52.36261	0.0000***
r d" 1	67.59553	46.23142	0.0001***
r d" 2	41.85068	40.07757	0.0312**
r d" 3	39.57674	33.87687	0.0094***
r d" 4	34.11493	27.58434	0.0063***
r d" 5	19.21516	21.13162	0.0908*
r d" 6	12.87277	14.26460	0.0820*
r d" 7	5.967114	3.841466	0.0146**

Note: *p<0.1; **p<0.05; ***p<0.01

Source: ©Author's own calculation

To confirm that there is a long-term connection between the variables, apply the Johansen cointegration test. The unrestricted cointegration rank test comprises the Trace and Maximum Eigenvalue tests, which are used to assess the presence of cointegration relationships among variables, indicating a long-run equilibrium relationship. Both the Trace test and the Maximum Eigenvalue test indicate the presence of multiple cointegration equations, as their respective test statistics significantly exceed the critical values at the 0.05 level. To be specific, the Trace test suggests the existence of 8 cointegrating equations, while the Maximum Eigenvalue test suggests 5. These results suggest that the variables are connected in the long run, meaning they tend to change in the same direction over time, even though they may not do so perfectly at all moments.

5. DISCUSSION

The results of our studies show that imports can hurt the economy. Specifically, when a country brings in more goods from other countries, it tends to lower the overall economic output. On the other hand, factors such as exchange rates, official development assistance, and gross capital formation have been identified as having significant positive effects on GDP. This implies that changes in these factors are associated with noticeable boosts in the country's economic output. Furthermore, the results suggest the existence of long-term relationships among the variables. That is why these variables are likely to move in conjunction with each other over extended periods, reflecting a certain level of interdependence. Moreover, it is significant to note that the variables are connected in a way that shows they share a stable, long-term relationship. This means that changes in one variable are linked to changes in another over time, indicating a consistent pattern between them. Additionally, it is important to highlight how strong and reliable the connection is between capital investment—like buildings, machinery, and infrastructure—and a country's overall economic growth. This consistent pattern across different studies shows that when a country invests more in these areas, it usually leads to a significant boost in its economy.

6. CONCLUSION

The pursuit of economic growth has been a driving force for human civilization since the dawn of time. A country's GDP is a vital indicator of its overall development and progress. To gain deeper insights into the factors that influence GDP growth, this study employed the ARDL framework for conducting an empirical analysis. It examined the impact of several economic variables, including FDI, inflation, rate of interest, exports, and imports on GDP. The study utilized a comprehensive set of time series data spanning three decades, from 1990 to 2021. By analyzing these variables, the study has better understood the dynamics of economic growth and identified the key drivers of development.

In the conducted study, an analysis has been presented on the prevalence of long-run cointegration among the independent variables concerning the dependent variable GDP. The research findings have indicated that some of the variables such as FDI, WPI, and ODA have a positive effect on the GDP but the result is statistically insignificant. Whereas, other variables such as EX, EXCH, and GCF have a positive and significant outcome on GDP. Furthermore, IMP has a negative and significant effect on GDP. Additionally, a brief study was carried out that showed a relationship between the variables in the short term. This study also provided insights into how these variables are related over the long term. The research has also demonstrated that the lagged differences have had a positive effect on the GDP. Additionally, the study has incorporated an error correction term signifying the convergence speed to equilibrium, which is evident to be high. This explanation suggests that the economy is poised to shift from a temporary imbalance to a more stable long-term state soon.

7. POLICY IMPLICATION

The outcomes of the study provide valuable insights for policymakers. The long-term India's growth of economy is supported by several key factors such as exports, imports, exchange rates, and gross capital formation. Exports play a critical role in generating revenue and fostering international trade relationships, while imports help meet domestic demands for goods and services that may not be produced locally. Additionally, exchange rates influence the competitiveness of Indian products on the global market, affecting both export and import dynamics. To enhance economic resilience and reduce over-reliance on specific regions or countries, Indian exporters must diversify their market presence. By exploring and entering new markets, businesses can mitigate risks associated with economic fluctuations in any single region and potentially tap into new sources of revenue. This strategic diversification allows for a broader customer base, which can contribute to sustained growth and stability in India's economy. Encouraging exporters to seek opportunities in emerging markets and strengthening trade partnerships can further support this initiative. Additionally, the Government should invest in infrastructure and capacity building to meet global quality standards and certifications, thereby bolstering the reputation of Indian products in international markets. The study also recommends the adoption of strategic import substitution policies to promote the development of domestic industries and decrease dependence on imported goods. Encouraging the production of critical goods domestically would enhance self-sufficiency. Finally, a technology-driven and professional environment should be fostered to ensure capital formation in economic growth.

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