European Economic Letters
ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

How FDI and Inflation Influence Economic Growth in India: An Econometric Investigation.

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Abstract:
This study investigates the nexus between foreign direct investment (FDI), inflation, and economic growth in India. The analysis employs the autoregressive distributed lag (ARDL) model and the bounds testing approach to examine long-run cointegration among these variables. Additionally, the error correction model (ECM) is applied to assess short-run dynamics. The empirical results confirm a stable long-term relationship between FDI, inflation, and economic growth. Furthermore, the findings indicate that FDI inflows and inflation exhibit a positive yet statistically insignificant impact on economic growth. Based on these outcomes, the study recommends that implementing more favorable government policies toward FDI could enhance the dynamism of the Indian economy.

Keywords: Foreign Direct Investment, Inflation, Economic Growth, ARDL, ECM
JEL CODE: C5, C01, C8, C87

I. Introduction

Since the implementation of economic liberalization policies in the early 1990s, India has emerged as one of the world's fastest-growing economies. Between 1992 and 2010, India sustained an average annual GDP growth rate of nearly 7%, coinciding with a significant surge in foreign direct investment (FDI) inflows. Notably, from 2001 to 2010, average annual FDI inflows reached $18.5 billion—a sixfold increase compared to the 1995–2000 period—positioning India among the top FDI recipients in the developing world Singaram et. al., (2025). This rapid economic expansion, coupled with escalating FDI, raises a critical research question: What is the true impact of FDI on India's economic growth, and under what conditions does it contribute to or hinder development? While the relationship between FDI and economic growth has been extensively studied in the context of developing economies, empirical findings remain inconclusive and context-dependent. Existing literature, including works by Tsai (1991), Borensztein et al. (1998), Zhang (2001), and Hansen & Rand (2005) and Singaram et. al., (2025)., generally supports a positive FDI-growth nexus. However, India's unique economic structure, regulatory environment, and sectoral disparities suggest that conventional assumptions may not hold. Despite India's increasing FDI inflows, limited and contradictory evidence exists regarding its actual growth effects. For instance: Pradhan (2002) and Agrawal (2005) found no significant positive correlation between FDI and growth in India. Conversely, Chakraborty & Nunnenkamp (2008) and Dash & Parida (2013) reported

conditional benefits, emphasizing the role of complementary factors like infrastructure and human capital. This ambiguity underscores a critical gap: prior studies either rely on outdated data, overlook structural breaks, or fail to account for inflation's moderating role—a key variable in India's macroeconomic landscape. This research contributes to the literature by: Employing advanced econometric techniques—the ARDL bounds testing approach and ECM—to simultaneously assess short- and long-run dynamics between FDI, inflation, and growth. Incorporating inflation as a mediating variable, addressing its dual role (as a growth stimulant or deterrent) in India's high-inflation, high-growth economy. Using the most recent and comprehensive dataset (1991–2023) to capture post-liberalization trends, including post-2010 FDI surges and economic reforms. Providing policy-specific insights on how FDI effectiveness depends on macroeconomic stability, offering actionable recommendations for Indian policymakers. The structure of the document is as follows: Section 2 outlines the econometric methodology and data sources. Section 3 presents the empirical results and related discussion, while Section 4 provides the main conclusions along with policy recommendations

II. REVIEW OF LITERATURE

Foreign Direct Investment (FDI) inflows are widely recognized as key drivers of a nation's development and economic advancement. Numerous empirical studies have explored the impact of FDI and trade—particularly exports—on economic growth. The roles of FDI, exports, and imports in promoting economic development have been extensively examined across various countries, timeframes, and through diverse econometric techniques and methodologies. The emergence of neoclassical growth theory further emphasized the idea that FDI supports economic growth, much like domestic investment, particularly in the short term, as noted in the foundational works of Harrod (2015), Domar (1946), and Solow (1956). Meanwhile, the endogenous growth theory, as developed by Lucas (1988), Romer (1986, 1993), and Rebelo (1991), argues that FDI contributes to long-term growth by facilitating technological advancement and the diffusion of knowledge.

Empirical evidence supports these theoretical foundations. Borensztein and Lee (1998), along with Lim and Maisom (2000), found that FDI fosters economic growth when combined with factors such as managerial expertise, human capital, export expansion, and technology transfer. Lipsey and Weiss (1981, 1984) identified a positive correlation between trade flows and FDI across different industries. For instance, Alexiou and Tsaliki (2007) examined the relationship between FDI and GDP in Greece from 1945 to 2003, revealing long-term growth driven by FDI. Similarly, Miankhel et al. (2009) studied six emerging economies—Chile, India, Mexico, Malaysia, Pakistan, and Thailand—and found long-run causality from GDP to FDI and other variables. Katircioglu (2009) applied the ARDL Bounds testing approach to Turkish data from 1970 to 2005, uncovering both short- and long-term links between FDI inflows and real GDP. In Tunisia, Belloumi (2014) employed the same method for the 1970–2008 period, confirming the long-run interplay among FDI, trade openness, and economic growth. Further, Sunde (2017) used the VECM Granger causality framework to identify a unidirectional causality from economic growth to FDI in South Africa, supporting the FDI-led growth hypothesis.

According to Singaram (2025), foreign direct investment, imports, and inflation have a positive influence on economic growth, whereas exports exhibit a negative impact. In light of these studies, the present paper aims to investigate the dynamic relationships among FDI inflows, exports, imports, and GDP in India during the period 1991–2024, employing the Autoregressive Distributed Lag (ARDL) Bounds testing approach.

III. RESEARCH METHODOLOGY:

The theoretical process of finding, choosing variables, and collecting data on a study subject is research methodology. The researcher evaluates the study's overall efficacy and accuracy. Topic selection, data collecting, interviews, questionnaires, and other processes are all part of the research strategy. The study is quantitative since secondary data was used to determine the relationship between agricultural production and economic growth in India.

Data sources and data types:

This studu based on secondary data secondary data was used in this investigation. The data was compiled using the World Development Indicator, the Indian Economic Survey, and the Handbook of Statistics. The sampling period for the study is 30 years, from 1991 to 2024.

Variables identified and their meanings:

•GDP (Gross Domestic Product) _____Dependent variable
• INF (Inflation Rate) _____Independent variable
•FDI (Foreign Direct Investment) _____Independent variable
• EXP (Export) _____Independent variable

Formulation of Hypotheses

H0 = FDI and Inflation in India has no positive association with economic growth.
H1: FDI and Inflation has a favorable association with India's economic growth.

Econometric Model:

This study's econometric model is as follows:

$GDPt = \beta 0 + \beta 1\ (FDIt) + \beta 2\ (INFt) + \beta 3\ (EXt) + \mu$ …… 1

Where GDP stands for Gross Domestic Product. INF stands for Inflation. EXP stand for Export
FDI, stand for foreign direct investment
$\beta 0$ = Interception
Slope Coeficient = $\beta 1, \beta 2, \beta 2, \beta 3,$
Error Term = μ

IV. DATA ANALYSIS:

Table 1: Descriptive Statistics:

	GDP	FDI	INF	EXP1
Mean	5.81	2.29	7.23	15.83

Median	6.59	2.18	6.49	13.54
Maximum	9.84	4.62	13.87	24.43
Minimum	-6.25	0.10	3.32	7.49
Std. Dev.	4.11	0.90	3.23	4.43
Skewness	-1.59	0.71	0.50	-0.8
Kurtosis	12.36	4.08	1.96	2.61

Auther's Calculation Eview-10

Table 2 the correlation matrix reveals that GDP has a weak positive correlation with FDI (0.13), INF (0.11), and EXP (0.16). FDI shows a strong positive correlation with EXP (0.79) and a moderate correlation with INF (0.13), while EXP is highly correlated with INF (1.00) and strongly correlated with FDI (0.78), indicating close interdependence among these variables.

Table 2: Results of Correlation Matrix

	GDP	**FDI**	**INF**	**EXP**
GDP	1.00	0.13	0.11	0.16
FDI	0.13	1.00	0.13	0.79
INF	0.11	0.79	0.13	1.00
EXP	0.16	0.78	0.07	0.98

Table 3 Displays the results of the ADF test:

	ADF Unit root Tests		PP Unit root test	
Variables	Level	First Difference	Level	First Difference
LGDP	-2.10	-4.65	-2.10	-4.37
LFDI	-1.81	-5.46	1.75	-6.20
LINF	-153.00	-5.45	-1.53	-5.48
LEXP	1.56	-4.07	-1.57	-4.07

Table 3 shows results of both the ADF and PP unit root tests indicate that all variables—**LGDP, LFDI, LINF, and LEXP**—are non-stationary at their levels but become stationary after first differencing. Specifically, the test statistics at the first difference are significantly lower than the critical values, confirming that all variables are integrated of order one, i.e., **I(1)**.

Autoregressive Distributed Lag Model:

The ARDL (Autoregressive Distributed Lag) approach is employed to analyze the relationship among Foreign Direct Investment (FDI), Exports, Imports, Inflation, and Economic Growth in the context of India. The ARDL bounds testing methodology, developed by Pesaran and Shin (1999), Pesaran et al. (2001), and initially outlined by Pesaran et al. (1996), is a flexible econometric technique that accommodates variables integrated at levels I(0), I(1), or a combination of both, provided none are integrated at I(2). This method is particularly advantageous in yielding reliable and robust estimates, even in the presence of small sample sizes. Moreover, it allows for the inclusion of variables with different optimal lag lengths within the same model. The general form of the ARDL model is specified as follows::

$Yt=\beta 0+\beta 1\ Yt\text{-}1+\ldots\beta q\ Yt\text{-}p+\alpha 0\ Xt+\alpha_1 Xt\text{-}_1+\alpha_2 Xt\text{-}_2+\ldots\alpha kXt\text{-}k+\varepsilon t$ ……2

The unconstrained vector error model, on the other hand, is shown below

$$\Delta GDP_t = \gamma_0 + \sum_{l=1}^{P} \gamma_1\, GDP_{t-1} + \sum_{l=1}^{P} \gamma_2\, FDI_{t-1} + \sum_{l=1}^{P} \gamma_3\, INF_{t-1} + \sum_{l=1}^{P} \gamma_4\, EXP_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots 3$$

The ARDL model, shown in Equation (3), demonstrates the long-run and short run connection between the dependent and independent variables. The intercept term is 0. The short-run coefficients of variables are γ0, γ1 γ2, γ3, γ4, explanatory variables, whereas the long run co-efficients of variables , and t is the stochastic error, which includes all missing variables in the equation.

The bound test for co-integration demonstrates the long-run relationship between the variables. Table 4 displays the results

F-Bounds Test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.011773	10%	2.2	3.09
k	3	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

The ARDL bounds test yields an F-statistic of 5.011773, which exceeds the upper critical bounds at all significance levels, including the 1% level (I(1) = 4.37). This result confirms the presence of a long-run cointegrating relationship among the variables.

Table;4 Long run ARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFDI	05.92	12.62	0.79	0.07
LINF	2.05	2.03	1.01	0.12
EXP	12.15	12.37	0.98	0.09
C	-28.02	29.83	-0.94	0.40

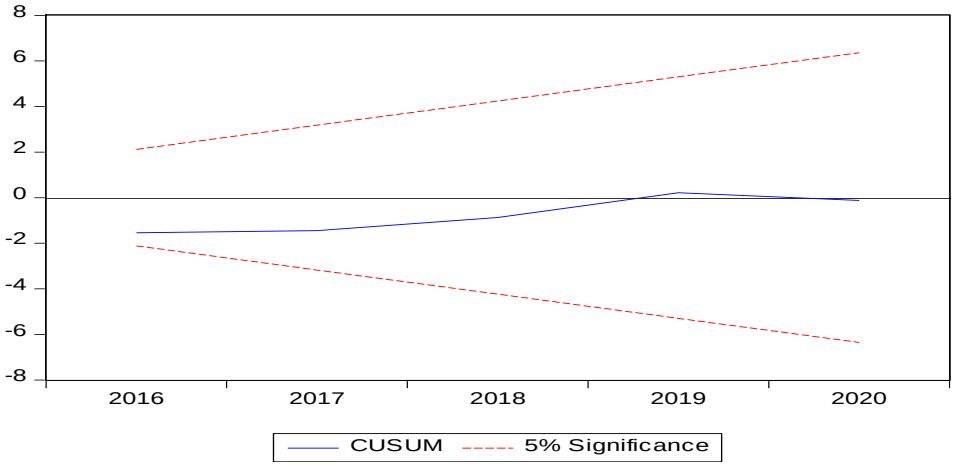
The ARDL long-run estimation results indicate that Foreign Direct Investment (LFDI) has a positive coefficient of 5.92; however, it is statistically insignificant at the 5% level ($p = 0.07$). Inflation (LINF) also shows a positive relationship (coefficient = 2.05), but the result lacks statistical significance ($p = 0.12$). Similarly, Exports (EXP) are positively associated with economic growth, with a coefficient of 12.15, though not significant at conventional levels ($p = 0.09$). The constant term (C) is negative (-28.02) and statistically insignificant ($p = 0.40$). Overall, while the variables show expected directional effects, the lack of significance suggests limited explanatory power in the long run.

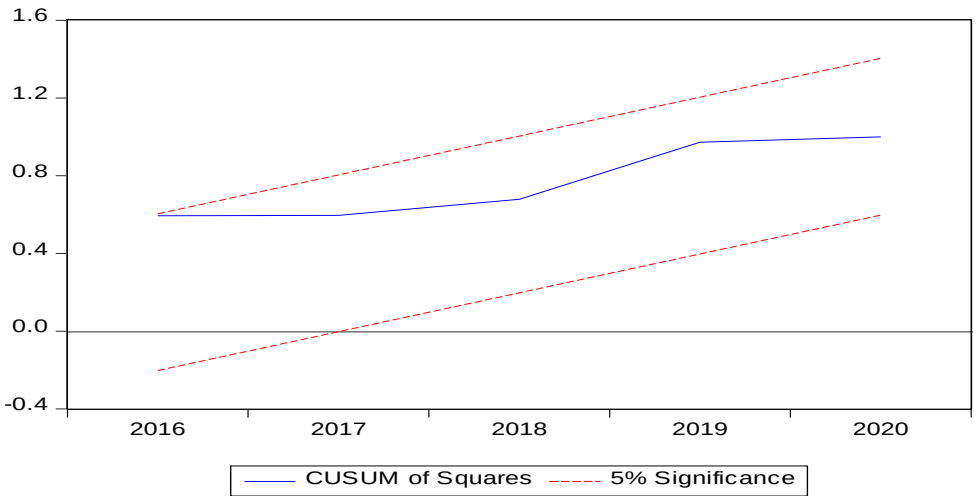
Table 5 Short run ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI)	-4.024	0.406	-9.899	0.001
D(INF)	-3.685	0.532	-6.930	0.002
D(EXP01)	2.107	0.347	6.069	0.004
CointEq(-1)*	0.764	0.109	6.981	0.002
R-squared	0.977			
Adjusted R-squared	0.936			

The short-run ARDL error correction model reveals that changes in FDI and Inflation have a significant negative impact on economic growth, with coefficients of -4.024 ($p = 0.001$) and -3.685 ($p = 0.002$), respectively. Conversely, exports (EXP01) exert a significant positive effect (coefficient = 2.107, $p = 0.004$). The error correction term (CointEq(-1)) is positive and highly significant (0.764, $p = 0.002$), indicating a strong adjustment towards long-run equilibrium, while the model demonstrates a high explanatory power with an R-squared of 0.977 and an adjusted R-squared of 0.936.

The Cumulative Sum (CUSUM) of recursive residuals test is employed to assess the stability of the estimated model in terms of both short-run dynamics and long-run relationships among the variables. This diagnostic tool helps determine whether the model parameters remain stable over the sample period. The corresponding CUSUM plot is presented below for visual inspection.





The findings show that the coefficients are not unstable, as seen by the plot of CUSUM and The CUSUM statistic is within the crucial bands of the 5% confidence range for parameter stability.

Findings of the Study:

The key findings of the study are summarized as follows:

Firstly, the analysis investigates the impact of selected explanatory variables—namely Foreign Direct Investment (FDI), Exports (EXP), and Inflation (INF)—on economic growth, measured by Gross Domestic Product (GDP). The results from the ARDL model indicate that while these variables are statistically insignificant in the long run, they exhibit significant short-run effects on economic growth.

Secondly, the study identifies that imports have a negative and statistically significant impact on economic growth in the long run, suggesting that the absence or reduction of imports may support India's economic expansion. The high R-squared value confirms that the model provides a good fit, with the independent variables collectively explaining a substantial portion of the variation in GDP.

The study examines the influence of FDI inflows, exports, imports, and inflation on India's economic growth over the period 1991 to 2024. Employing the ARDL bounds testing approach, the research explores both long-run and short-run dynamics among the variables.

The cointegration analysis reveals a weak and statistically insignificant long-run relationship between GDP and variables such as FDI and exports, while imports demonstrate a negative association. These findings underscore the short-run responsiveness of GDP to policy changes in investment, trade, and price levels, with limited evidence of long-run dependence.

V. Conclusion & Policy Recommendations:

The findings of this study hold important implications for Indian policymakers, particularly in advocating for a strategic focus on FDI- and export-led growth. The results suggest that the adoption of additional structural policies—accompanied by clear objectives and commitments—could further enhance the effectiveness of economic reforms.

Although FDI inflows into India have increased in recent years, empirical evidence on the spillover effects of FDI remains limited and inconclusive. This underscores a critical policy implication: since FDI has been shown to serve as a catalyst for economic growth in India, adopting a more proactive and liberalized approach to attracting FDI in targeted sectors may enhance knowledge transfer and foster productivity-driven growth.

Typically, FDI-induced productivity gains are closely associated with export expansion in host countries. Therefore, government efforts aimed at facilitating industrial upgrading—particularly toward high-tech and advanced sectors—could simultaneously strengthen both FDI inflows and export performance, thereby promoting sustainable economic growth.

Finally, while this study provides valuable insights, it is limited by the lack of disaggregated data at the sectoral or industry level. Future research should consider exploring sector-specific dynamics to better understand heterogeneity in the effects of FDI and trade on economic performance.

Contributions from the Authors: ARS frame work, Written Part, MS; Analysis of Result and data collection

Conflicts of Interest: The authors state that they do not have any conflicts.

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