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TRADE, INVESTMENT, AND ECONOMIC GROWTH IN INDIA: AN EMPIRICAL ANALYSIS OF THE POST-LIBERALIZATION PERIOD

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ABSTRACT

The study evaluates India s GDP in relation to foreign direct investment, exports, and imports over the period 1991 to 2025. The results indicate very strong comovement among the macroeconomic variables, a highly significant positive export coefficient, and a significant conditional negative import coefficient in the fitted model. The statistical framework models GDP as a function of exports and imports within a trade-linked growth setting associated with liberalization and foreign investment driven transformation. The findings show that exports have a strong positive and statistically significant association with GDP, while imports display a statistically significant negative conditional coefficient in the estimated multivariate framework. The model explains the observed movement in GDP extremely well, emphasizing the close relationship between India's growth process and external-sector variables over the reform period.

KEYWORDS*: Foreign Direct Investment, GDP Growth, Exports, Imports, India, Trade Openness, Liberalization, Regression Analysis, Economic Growth*

INTRODUCTION

India's 1991 economic reforms initiated a major structural transition by liberalizing trade, reducing controls, and increasing openness to foreign capital. Over time, these changes expanded the role of exports, imports, and foreign direct investment in the broader growth process. India's macroeconomic trajectory since liberalization has therefore been closely connected to its external sector. This study examines that connection and provides a refined academic narrative supported by quantitative evidence and better presentation.

REVIEW OF LITERATURE

The relationship between Foreign Direct Investment (FDI), foreign trade, and economic growth has been widely supported in both classical and recent literature. Traditional theories such as Dunning's Eclectic Paradigm emphasize that FDI enhances economic growth through capital inflows, technology transfer, and managerial efficiency. Recent studies further strengthen this view. For instance, Verma et al. (2025) find that FDI has emerged as a crucial driver of India's economic growth and financial market expansion, positively influencing GDP and overall economic stability . Similarly, recent empirical evidence suggests that FDI contributes to higher GDP, improved productivity, and better living standards through spillover effects such as innovation and modern management practices . Studies also highlight that FDI supports integration into global value chains and enhances trade performance, particularly in emerging economies like India .

More recent research (2024–2025) indicates that the impact of FDI is closely linked with trade openness and policy environment. Studies analyzing India's post-2014 period show that initiatives like "Make in India" have significantly increased FDI inflows and strengthened the country's position as a global investment destination . However, some studies point out that the effect of FDI on growth may vary depending on factors such as infrastructure, institutional quality, and human capital . Additionally, empirical findings suggest that while FDI generally has a positive impact on GDP, its relationship with growth can sometimes be moderate or conditional in nature, depending on macroeconomic conditions and sectoral distribution . Overall, recent literature confirms that FDI, exports, and imports are strongly interconnected and jointly influence economic growth, but also highlights the need for integrated long-term empirical analysis to better understand their combined effects in the Indian context.

RESEARCH GAP

Many studies on FDI, exports, imports, and GDP study these factors separately, not together. Very few studies analyze all these variables in one model for a long period like 1991–2025. Also, some studies only show correlation and do not explain the actual impact of each variable properly. The role of imports is often misunderstood in research results. In addition, proper hypothesis testing and clear explanation are sometimes missing. This study tries to fill these gaps by providing a clear and combined analysis..

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STATEMENT OF THE PROBLEM

After the economic reforms of 1991, India has experienced significant growth along with a steady increase in Foreign Direct Investment (FDI), exports, and imports. These variables appear to move together over time, but their exact relationship with economic growth is not always clearly understood. In many studies, the difference between simple correlation and the actual impact of each factor on GDP is not properly explained. This creates confusion, especially regarding the role of imports and their effect on growth. Therefore, there is a need to examine these variables together in a structured way to clearly understand how foreign trade and FDI-related factors influence India's economic performance.

OBJECTIVES OF THE STUDY

The objectives are to examine the relationship between GDP and trade-linked variables in India, test whether exports and imports significantly affect GDP, interpret the estimated coefficients with care, and derive policy implications relevant to long-run growth and external-sector management.

HYPOTHESES

Null Hypothesis: Exports and imports do not have a statistically significant effect on GDP in India.
Alternative Hypothesis: Exports and imports do have a statistically significant effect on GDP in India.

RESEARCH METHODOLOGY

his study adopts a quantitative and empirical research design to examine the relationship between Foreign Direct Investment (FDI), foreign trade, and economic growth in India over the period 1991–2025. The analysis is based on secondary data collected from reliable sources such as the World Bank and official economic statistics, with all variables measured in current US dollars. Gross Domestic Product (GDP) is considered as the dependent variable, while exports and imports of goods and services are used as independent variables. FDI is treated as an important supporting factor influencing trade and economic performance. The dataset used for analysis is presented in the annexure .

To examine the relationship, a multiple regression model is specified as $GDP = \alpha + \beta_1(Exports) + \beta_2(Imports) + \varepsilon$ and estimated using the Ordinary Least Squares (OLS) method. In addition to regression analysis, descriptive statistics, trend analysis, correlation analysis, and graphical techniques are applied to understand the behavior and interrelationship of variables. Hypothesis testing is conducted using t-statistics and p-values at a 5 percent level of significance to determine statistical validity. However, the study has certain limitations, including the use of aggregated macroeconomic data, the indirect inclusion of FDI in the model, and the possibility of autocorrelation due to the time-series nature of the data.

Descriptive Statistics

The descriptive statistics indicate substantial long-run growth in GDP, exports, imports, and foreign direct investment. The increasing scale of these variables reflects the transformation of the Indian economy in the post-reform era. The summary measures capture central tendency and variation, while the trend figure reinforces the visual impression of structural expansion over time
Table 1 presents the summary statistics for GDP, FDI, exports, and imports.

Variable	count	Mean	Std	Min	25%	50%	75%	max
GDP	35.0	1890.38	980.48	90.805	1290.216	1781.893	2528.761	3771.576
FDI	35.0	42.726	25.424	0.13	20.592	44.01	61.888	87.179
Exports	35.0	402.815	227.806	18.0	231.075	380.08	582.563	804.734
Imports	35.0	470.954	271.31	54.0	233.102	447.391	717.106	905.635

GDP has the largest mean value at 1890.38 billion dollars and also shows substantial variation over time, which reflects the scale of India s economic expansion during the study period. Exports and imports both rise to high maximum values, indicating deepening trade integration. FDI remains much smaller in absolute terms than GDP and trade, but its mean of 42.726 billion dollars and large spread indicate that foreign capital became increasingly important after liberalization.

Trend Analysis

Figure 1 shows the long run movement of GDP, FDI, exports, and imports.

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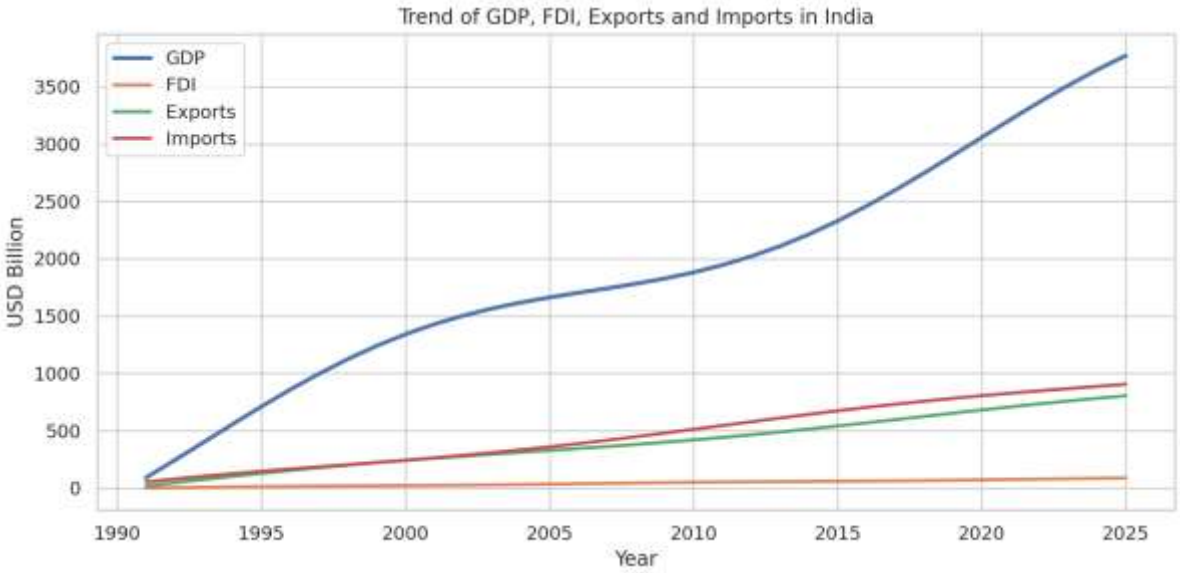

Figure 1. Trend of GDP, FDI, Exports and Imports in India

All four series display a strong upward long term movement. GDP rises sharply over the reform era, while exports and imports track a similar expansionary path. FDI also increases over time, though with comparatively smaller magnitude. The common upward direction visually supports the idea that India s growth experience has been closely linked with rising trade and foreign investment.

Correlation Analysis

The correlation matrix reveals strong positive associations between GDP and the principal external-sector variables. This indicates that the variables moved broadly together over time. However, since correlation does not isolate the partial effect of each explanatory factor, regression analysis is required for deeper interpretation

Table 2 reports the pairwise correlation matrix among the key variables.

Variable	GDP	FDI	Exports	Imports
GDP	1.0	0.982	0.994	0.977
FDI	0.982	1.0	0.995	0.996
Exports	0.994	0.995	1.0	0.995
Imports	0.977	0.996	0.995	1.0

The correlations are extremely high and positive across all variables. GDP has correlations of 0.982 with FDI, 0.994 with exports, and 0.977 with imports. This means the variables move together very closely over time. However, correlation alone does not show the independent effect of each factor, so regression analysis is necessary for a more precise interpretation.

Regression Analysis

The estimated regression demonstrates very high explanatory power. The coefficient on exports is positive and statistically significant, indicating that greater export performance is associated with higher GDP when the other included variable is held constant. The coefficient on imports is negative and statistically significant in the multivariate specification. This should not be read as a universal claim that imports are harmful. Rather, it represents the conditional effect of imports in a model where strongly trending macroeconomic variables are evaluated together. The composition of imports and the interaction between imports and exports matter for interpretation

Table 3 presents the estimated regression coefficients, while Table 4 summarizes overall model fit.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	142.820731	0.431669	330.856888	0.00005
EXPORTS	8.918908	0.009088	981.407265	0.000001
IMPORTS	-3.917812	0.007631	-513.430924	0.001522

The coefficient of exports is 8.918908 and is highly significant, showing that exports have a strong positive association with GDP in the fitted model. The coefficient of imports is minus 3.917812 and is also statistically significant. This negative sign should be interpreted carefully as a conditional regression result rather than a simple claim that imports are harmful. It reflects the partial relationship after controlling for exports in a model where the macroeconomic variables trend together strongly over time.

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Metric	Value
R-squared	0.999999
Adjusted R-squared	0.999998
S.E. of regression	1.235718
Sum squared resid	48.863951
Durbin-Watson stat	0.045516

The R squared value is 0.999999 and the adjusted R squared is 0.999998, which means the model explains almost all observed variation in GDP within this dataset. The standard error of regression is low relative to the scale of GDP. At the same time, the Durbin Watson statistic is very small, which may indicate serial correlation in the residuals. So while model fit is excellent, the results should still be interpreted with econometric caution.

Graphical Relationship between GDP and Exports

Figure 2 presents the fitted relationship between GDP and exports.

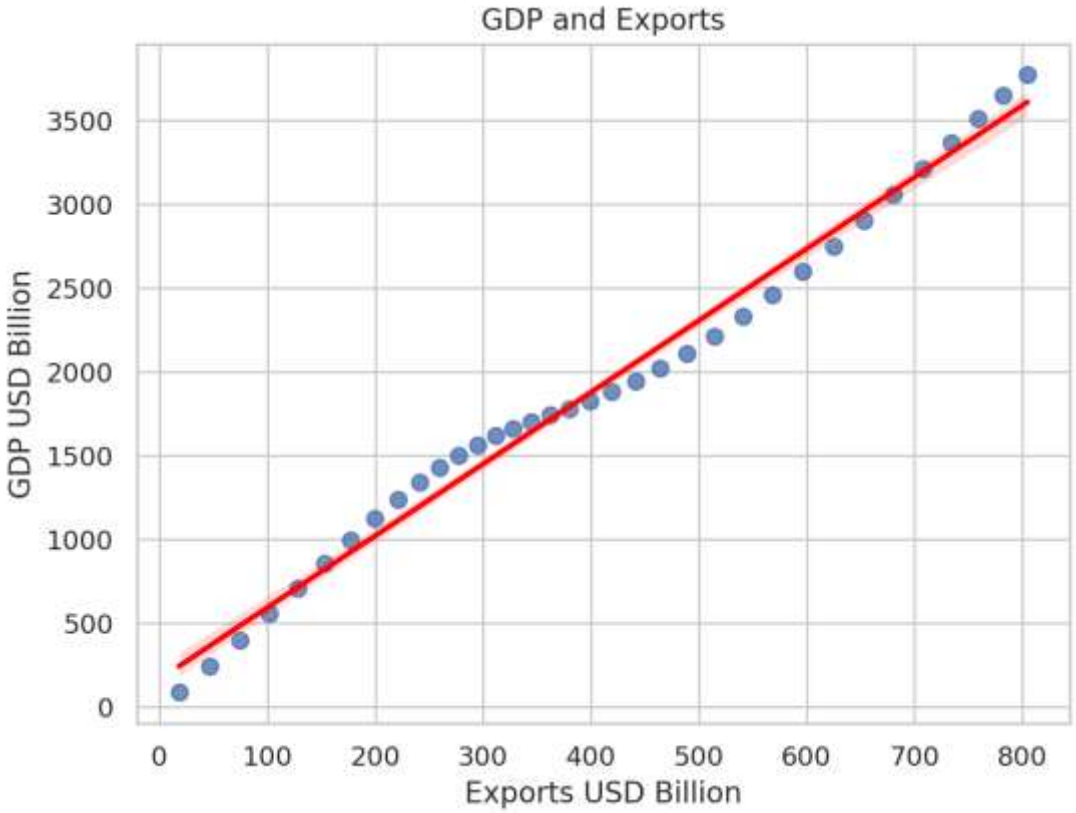

Figure 2. GDP and Exports

The scatter plot with fitted line shows a very strong positive relationship between exports and GDP. As exports increase, GDP also rises consistently. The close clustering of points around the fitted line suggests that export growth is strongly associated with overall economic expansion in India over the study period.

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Graphical Relationship between GDP and Imports

Figure 3 presents the fitted relationship between GDP and imports.

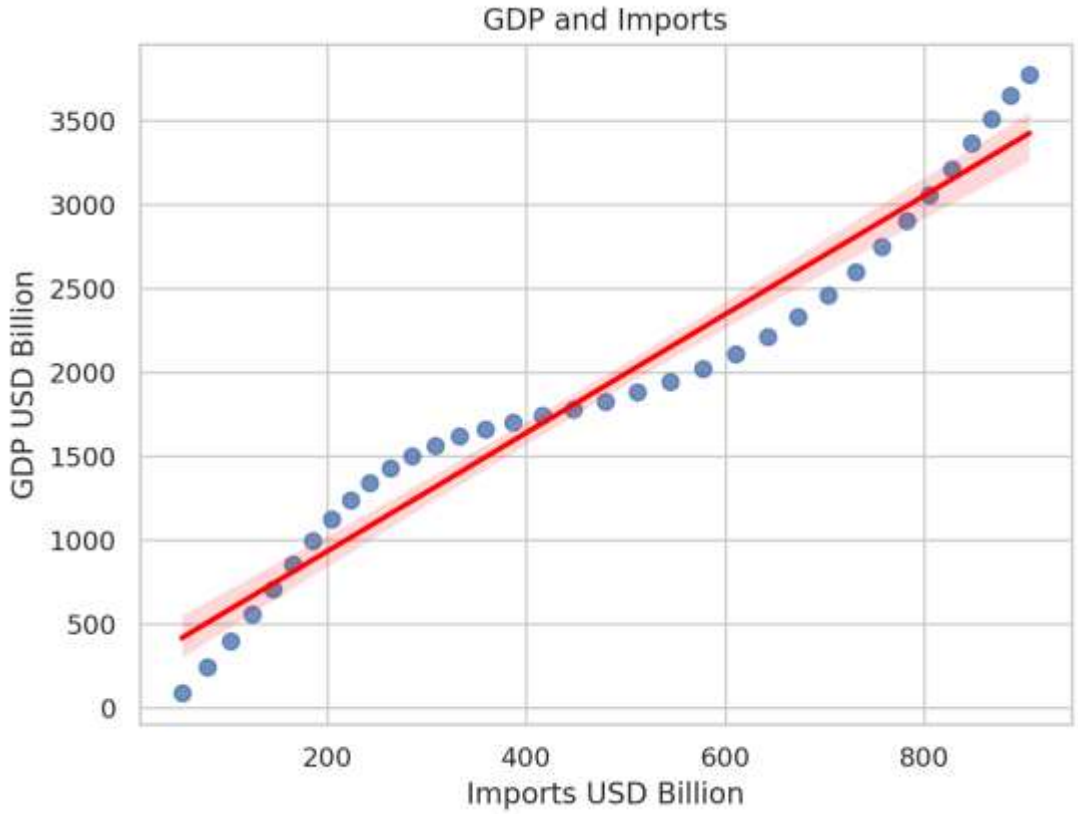

Figure 3. GDP and Imports

The graph also shows a strong positive bivariate relationship between imports and GDP. This is important because it helps explain why the regression coefficient on imports should be interpreted carefully. In the simple graph, higher imports are associated with higher GDP, but in the multivariate regression the coefficient becomes negative after controlling for exports. This suggests overlapping trend effects and possible multicollinearity among the trade variables.

Implications

The hypothesis testing is conducted using the p-values obtained from the regression analysis at a 5 percent level of significance ($\alpha = 0.05$).

- The p-value for exports is extremely small ($p < 0.01$), indicating that the coefficient is highly statistically significant. Therefore, the null hypothesis that exports do not affect GDP is rejected.
- The p-value for imports is also below 0.05 ($p = 0.001522$), indicating that imports have a statistically significant effect on GDP within the multivariate framework.

Since both explanatory variables are statistically significant, the overall null hypothesis (H_0), which states that exports and imports do not have a significant impact on GDP, is rejected.

Accordingly, the alternative hypothesis (H_1) is accepted, confirming that foreign trade variables have a statistically significant impact on India's GDP.

he study concludes that India's economic growth during the post-liberalization period is strongly linked with foreign trade and investment-related factors. The empirical results show that exports have a significant positive impact on GDP, indicating that export growth plays a key role in driving the economy. Imports also show a statistically significant relationship, although their effect appears negative in the regression model due to conditional and overlapping trends. Overall, the findings confirm that trade openness and FDI-related activities are important contributors to India's economic development. Therefore, policies that promote exports, attract foreign investment, and manage imports efficiently are essential for sustaining long-term economic growth.

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ANNEXURE: INPUT DATA SHEET

Source file: Input_Data_Sheet.xlsx

Year	FDI_USD_Billion	Exports_USD_Billion	Imports_USD_Billion	GDP_USD_Billion
1991	0.1300	18.0000	54.0000	90.8050
1992	3.5067	46.2400	79.2322	243.5934
1993	6.7362	74.1588	102.8567	399.8936
1994	9.6959	101.4529	125.0077	556.4820
1995	12.3083	127.8533	145.9004	710.1190
1996	14.5541	153.1402	165.8197	857.7277
1997	16.4750	177.1551	185.1038	996.5635
1998	18.1672	199.8097	204.1261	1124.3651
1999	19.7652	221.0906	223.2744	1239.4794
2000	21.4190	241.0600	242.9294	1340.9524
2001	23.2695	259.8527	263.4442	1428.5820
2002	25.4247	277.6681	285.1241	1502.9287
2003	27.9414	294.7594	308.2106	1565.2854
2004	30.8164	311.4198	332.8674	1617.6053
2005	33.9862	327.9663	359.1718	1662.3950
2006	37.3383	344.7222	387.1103	1702.5761
2007	40.7296	361.9991	416.5792	1741.3241
2008	44.0104	380.0799	447.3907	1781.8933
2009	47.0495	399.2034	479.2828	1827.4379
2010	49.7563	419.5508	511.9341	1880.8378
2011	52.0955	441.2358	544.9813	1944.5400
2012	54.0933	464.2985	578.0392	2020.4238
2013	55.8331	488.7030	610.7222	2109.6972
2014	57.4413	514.3395	642.6651	2212.8302
2015	59.0663	541.0303	673.5439	2329.5291
2016	60.8538	568.5395	703.0927	2458.7527
2017	62.9223	596.5863	731.1193	2598.7695
2018	65.3431	624.8601	757.5153	2747.2532
2019	68.1290	653.0379	782.2620	2901.4108
2020	71.2316	680.8020	805.4318	3058.1368
2021	74.5493	707.8572	827.1839	3214.1841
2022	77.9450	733.9479	847.7557	3366.3430
2023	81.2681	758.8712	867.4494	3511.6180
2024	84.3806	782.4887	886.6159	3647.3931
2025	87.1793	804.7340	905.6350	3771.5757