Journal of Informatics Education and Research
ISSN: 1526-4726
Vol 5 Issue 1s (2025)

The Role Of Foreign Direct Investment Inflow And Outflow In India'S Economic Growth

Dr. Shikha Srivastava[1], Dr. Ankita Kumari[2], Dr. Krishna Kumar Verma[3]
s

[1]Assistant Professor, Faculty of Commerce & Management United University Prayagraj
Email Id- shikha@uniteduniversity.edu.in
[2]Assistant Professor, Department of Management SRMS IBS UNNAO, Lucknow, UP
Email Id- ankita.ibs@srms.ac.in
[3]Associate Professor, Department of Commerce Central University of Himachal Pradesh
Email Id- kkpvan@gmail.com Orcid ID: 0009-0003-3904-6823

Abstract
This study explores the dual role of Foreign Direct Investment (FDI) inflows and outflows in shaping India's economic growth from 2000 to 2022. Employing advanced econometric tools such as Autoregressive (AR) models, Moving Average (MA) Models, Johansen Co-integration, and Granger Causality tests, the research investigates the dynamic interrelationship between FDI trends and economic performance. The analysis confirms a long-term equilibrium between FDI inflows and outflows, with past values significantly predicting future movements, especially in outflows. FDI inflows have fueled sectoral development, employment, and technological advancement, while outflows signify India's growing global footprint and strategic investments abroad. The Granger Causality test indicates that outflows predict inflows but not vice versa. These findings highlight the importance of FDI as a catalyst for economic development and suggest that a balanced and strategic approach to both inward and outward FDI can enhance India's position in the global economy. The study offers key insights for policymakers and investors alike.

Keywords: Foreign Direct Investment, FDI Trends, Autoregressive Models, Moving Average Models, Co-integration, Granger Causality, India's Economy.

1. Introduction
Foreign Direct Investment (FDI) has been a cornerstone of the economic development of India, an emerging global power with a rapidly expanding economy. Historically, FDI has been a significant contributor to India's growth, especially since the economic reforms of the 1990s. India has been one of the world's most desirable locations for foreign direct investment (FDI) in recent years because of its enormous market potential, favorable demographics, and progressive legislative framework (Kumar, 2021).

In recent years, India has witnessed a remarkable surge in FDI inflows. For instance, in the financial year 2020-2021, despite the global economic slowdown due to the COVID-19 pandemic, India recorded FDI inflows of approximately $81.97 billion, the highest ever for the country (Department for Promotion of Industry and Internal Trade, 2021). This remarkable figure served as a testament to the resilience and potential of the Indian economy. Furthermore,

these investments have been diverse, spanning various sectors, such as services, computer software and hardware, telecommunications, and trading (Reserve Bank of India, 2021).
On the other hand, India has steadily increased its footprint in terms of outbound FDI. Indian companies, in their pursuit of global expansion, have made significant investments in various parts of the world, marking India's transition from importing capital to exporting capital. This dual role of India as both a recipient and source of FDI underscores the multifaceted impact of FDI on its economy (RBI, 2021).

In essence, FDI is not just about capital inflows and outflows; it has facilitated the transfer of technology, created employment opportunities, and fostered a more competitive business environment in India. Thus, the evolving narrative of FDI in India is a story of economic aspirations, global integration, and transformative growth (Kumar, 2021).

2. Review Of Literature

The literature on the role of Foreign Direct Investment (FDI) in India's economic growth and its comparison with other emerging economies provides a diverse range of perspectives and findings. Below is a review of relevant literature.

Yalcinkaya (2017) examines how foreign direct investment (FDI) inflows and outflows affect the long-term economic growth of G-7 and a few other developing market nations, such as India. The authors discovered that FDI inflows significantly and favorably impacted emerging nations' rates of economic development. Similarly, Hasan (2015) examined the role of FDI in emerging market economies, focusing on the merits and demerits of FDI in these economies. Hasan specifically examines India, China, and Brazil, highlighting how FDI plays a vital role in strengthening economies thought capital inflows and currency appreciation. Similarly, Kulkarni (2021) evaluated the long and short-run impacts of FDI on India's economic growth using the autoregressive distributed lag approach of co-integration. They concluded that FDI significantly enhances India's economic growth. Another study by Rodionova (2021) The study examines the effects of FDI, or foreign direct investment, on the Indian economy from 2000 to 2020. The authors discovered a strong correlation between foreign direct investment (FDI) and imports, exports, and payments of investment income to non-residents.

Flora (2017) examined the impact of FDI inflows and outflows on the economies of Asian emerging countries, including India. They suggest that FDI inflows have substantial positive impacts on economic growth and are key factors supporting accelerated economic development. Another study by Mohanasundaram (2015) explored the relationship between foreign direct investment (FDI) and economic growth in India from 2000 to 2014. The authors used various econometric tools and found a positive association between FDI inflows and India's GDP. Similarly, Khatodia (2016) assessed employment growth in the public and private sectors in India due to the flow of foreign capital. They conclude that foreign capital inflows have a significant positive impact on private sector employment growth.

3. The Impact Of Fdi Inflows On India'S Economic Growth

Foreign Direct Investment (FDI) inflows into India have been pivotal in driving economic growth by bringing in capital, technology, expertise, and access to global markets. In the financial year 2020-2021, India attracted record FDI inflows of around $81.97 billion, underscoring a strong correlation between foreign investment and economic prosperity (Department for Promotion of Industry and Internal Trade, 2021). This capital influx has fueled growth across various sectors, created employment opportunities, and modernized India's industrial sector with advanced technologies and management practices. Additionally, FDI has also enhanced India's export capabilities, with many foreign firms setting up export-oriented units.

FDI distribution across different sectors and regions further highlights its diverse impacts. Sectors such as services, computer software and hardware, telecommunications, and trading are major FDI recipients. For instance, the service sector alone attracted over 17% of the total FDI equity inflow from April 2000 to June 2020 (Reserve Bank of India, 2021). Regionally, states such as Maharashtra, Karnataka, Delhi, Tamil Nadu, and Gujarat have traditionally attracted the highest FDI inflows because of their better infrastructure and business-friendly environments. Emerging sectors, such as e-commerce, fintech, and renewable energy are also becoming attractive FDI destinations, reflecting India's evolving economic landscape.

The broad-based impact of FDI underscores its significant role in enhancing sectoral productivity, regional development, and overall economic dynamics. By continuing to attract substantial FDI inflows, India is expected to further consolidate its positive effects on economic growth and development, driving the country towards greater global integration and prosperity.

4. The Role Of Fdi Outflows In India’S Economic Development

Indian enterprises are increasingly engaged in outward Foreign Direct Investment (FDI), highlighting India's growing global economic influence. In 2019, India's outward FDI reached around $12.6 billion, reflecting a trend of Indian businesses expanding globally (Reserve Bank of India, 2020). This expansion includes investments in traditional markets such as the US and Europe, as well as emerging economies in Africa, Latin America, and Southeast Asia. The sectoral spread is diverse, with investments in the information technology, pharmaceuticals, automotive, and manufacturing sectors, showcasing India's industrial strength.

FDI outflows from India significantly impact the country’s global economic standing. Outward FDI has integrated India more closely with the global economy, creating new markets for Indian products and services and facilitating greater cross-border trade and investment flows. Additionally, Indian companies have transferred management practices and operational efficiency to their subsidiaries, enhancing India's reputation as a source of managerial and technical expertise. While FDI outflows represent capital outflows, they are balanced by remittances and returns on these investments, positively contributing to India's balance of payments in the long term (RBI, 2020). Moreover, Indian companies have acquired strategic assets through their foreign investments, boosting India's economic clout.

The role of FDI outflows in India’s economic development is multifaceted, reflecting the country's evolving international economic strategy. This outward FDI enhances India's global

economic stature and contributes to domestic growth through backflows of capital, technology, and enhanced competitive capabilities. By strategically investing abroad, Indian enterprises expand their global reach and foster economic growth and innovation within India, reinforcing the country's position as a significant player in the global economy.

5. Methodology

- **Time period:** 2020 to 2022 (22 years)

Table 1.1: Foreign Direct Investment (FDI) Inflows and Outflows as a Percentage of GDP for India (2000-2022)

Year	India Foreign direct investment, net inflows (% of GDP)	India Foreign direct investment, net outflows (% of GDP) - India	Year	India Foreign direct investment, net inflows (% of GDP)	India Foreign direct investment, net outflows (% of GDP) - India
2000	0.8	0.1	2012	1.3	0.5
2001	1.1	0.2	2013	1.5	0.1
2002	1.0	0.2	2014	1.7	0.6
2003	0.6	0.2	2015	2.1	0.4
2004	0.8	0.3	2016	1.9	0.2
2005	0.9	0.3	2017	1.5	0.4
2006	2.1	1.5	2018	1.6	0.4
2007	2.1	1.4	2019	1.8	0.5
2008	3.6	1.6	2020	2.4	0.4
2009	2.7	1.2	2021	1.4	0.5
2010	1.6	1.0	2022	1.5	0.4
2011	2.0	0.7			

- **Tool used for Data Collection:** Econometric Model- Autoregressive models (AR), Moving Average models, Co-integration test, Granger Causality test and Vector Auto-regression (VAR) model

5.1. The comparative Time-Series

India's Foreign Direct Investment (FDI) for both net inflows and net outflows, expressed as a percentage of GDP, over several years. To perform a comparative time-series analysis, I focused on these two series. I will create a table summarizing key statistics such as the mean, median, standard deviation, and others for both net inflows and net outflows.

The comparative time-series analysis of FDI net inflows and net outflows is summarized in the following table:

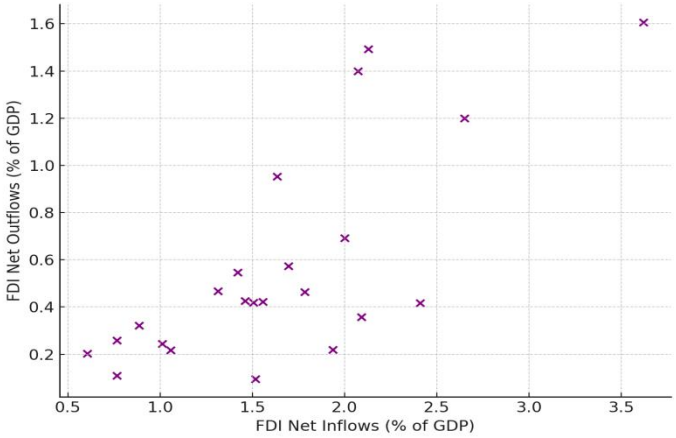
Table 1.2: Descriptive Statistics of FDI Inflows and Outflows (% of GDP)

Statistic	FDI Net Inflows	FDI Net Outflows
Count	23	23
Mean	1.647775	0.569747
Standard Deviation	0.692232	0.447783
Minimum	0.605889	0.095057
25th Percentile	1.184656	0.251975
Median (50th Percentile)	1.558215	0.422423
75th Percentile	2.037729	0.63235
Maximum	3.620523	1.606189

Interpretation:

- **Count**: Number of observations (years) in the dataset for each series.
- **Mean**: Average value of FDI net inflows and net outflows over the period.
- **Standard Deviation**: Indicates the variability or spread of the data around the mean.
- **Minimum and Maximum**: The lowest and highest values in each series.
- **Percentiles (25th, 50th/Median, 75th)**: These values show the distribution of the data. For example, the median indicates that half of the observations fell below this value.

Figure 1.1: Scatter Plot of FDI Net Inflows vs. Net Outflows



This plot visually represents the correlation between FDI net inflows and net outflows as a percentage of GDP, which can provide insights into their interrelation in the context of comparative time-series analysis.

5.2. Autoregressive models

The Autoregressive (AR) model is a type of time-series model that uses observations from previous time steps as input to a regression equation to predict the value at the next time step. The general formula for an AR model of order p (denoted as AR(p)) is

$$Y_t = c + \emptyset_1 Y_{t-1} + \emptyset_2 Y_{t-2} + \ldots + \emptyset_p Y_{t-p} + \varepsilon_t$$

Figure 1.2: FDI Net Outflows (% of GDP): Observed vs Predicted

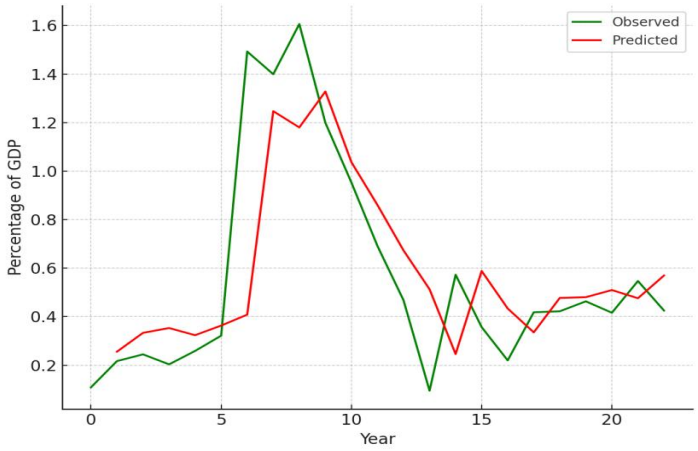
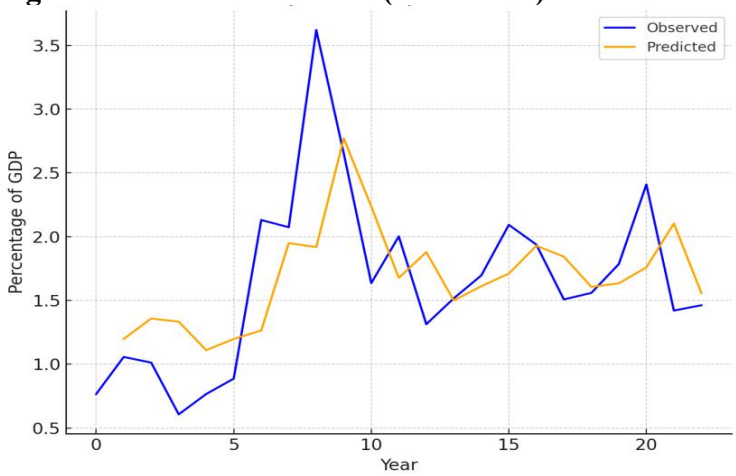


Figure 1.3: FDI Net Inflows (% of GDP): Observed vs Predicted



5.3. Moving Average (MA) model

The Moving Average (MA) model is a type of time-series model that uses past forecast errors in a regression-like model to predict future values. The general formula for an MA model of order q (denoted as MA(q)) is

$$Y_t = \mu + \varepsilon_t + \theta_1 \varepsilon_{t-1} + \theta_2 \varepsilon_{t-2} + \ldots + \theta_q \varepsilon_{t-q}$$

The Moving Average (MA) models for both net FDI inflows and net outflows of India were estimated. These models suggest that for both net FDI inflows and net outflows of India, the MA component provides some explanation of the series, although the significance of the MA terms varies. The constant terms in both models were significant, indicating a consistent average level in the series over the observed period.

Figure 1.4: FDI Net Inflow (% of GDP): Observed vs Predicted (MA Model)

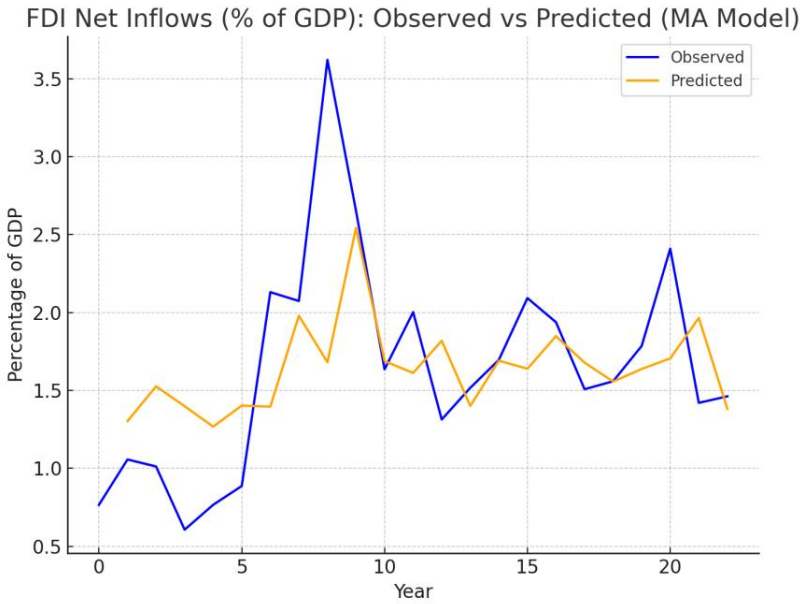
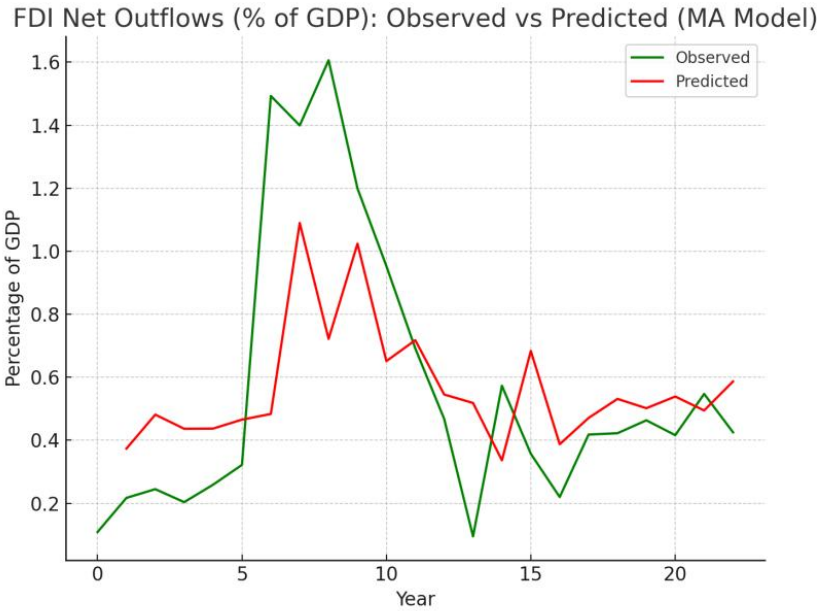


Figure 1.5: FDI Net Inflow (% of GDP): Observed vs Predicted (MA Model)



5.4. Johansen Co-integration Test

The Johansen Co-integration test is a statistical method used to determine the co-integration relationship between multiple non-stationary time series. Unlike simpler tests, the Johansen test can handle more than two time series and multiple co-integration vectors. The test is based on a vector autoregressive (VAR) model of order p:

$$\Delta Y_t = \Pi Y_{t-1} + \Gamma_1 \Delta Y_{t-1} + \Gamma_2 \Delta Y_{t-2} + \ldots + \Gamma_{p-1} \Delta Y_{t-p+1} + \varepsilon_t$$

The test involves two statistics:

1. **Trace Statistic**: Tests the null hypothesis of at most *r* co-integrating vectors against the alternative of more than *r* co-integrating vectors.
2. **Maximum Eigenvalue (Max-Eigen) Statistic**: Tests the null hypothesis of *r* co-integrating vectors against the alternative of *r*+1 co-integrating vectors.

The Johansen Co-integration test procedure involves estimating the VAR model and testing the significance of the eigenvalues of the Π matrix. The number of significant eigenvalues indicates the number of co-integrating relationships.

Critical values for these statistics are usually obtained from tables or simulations because they do not follow standard distributions. The decision to reject the null hypothesis was based on comparing the computed test statistics with these critical values.

The Johansen Co-integration test examines the presence of co-integrating relationships in a system of multiple time-series. The results can be interpreted as follow:

- **Trace Statistic**: Tests the null hypothesis of at most *r* co-integrating relationships against the alternative of more than *r* co-integrating relationships.
- **Max-Eigen Statistic**: Tests the null hypothesis of exactly *r* co-integrating relationships against the alternative of *r*+1 co-integrating relationships.

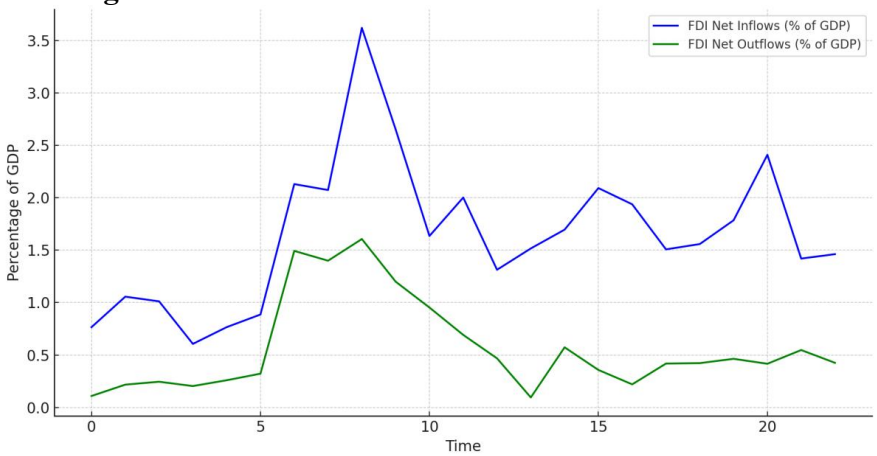
In the context of these results:

- For rank 0 (testing the hypothesis of no co-integrating relationship), the trace statistic is lower than its 5% critical value, suggesting that we cannot reject the null hypothesis of no co-integration at this level.
- For rank 1 (testing the hypothesis of at most one co-integrating relationship), the trace statistic is higher than its 5% critical value, suggesting that we can reject the null hypothesis in favor of the alternative that there is at least one co-integrating relationship.

This implies that there is evidence of at least one co-integrating relationship between net FDI inflows and net outflows in the dataset, indicating a long-term equilibrium relationship between these two time series.

A plot visually representing the FDI net inflows and net outflows over time was created. This graph can help to visually inspect the potential co-integration relationship between these two time series.

Figure 1.6: FDI Net Inflows and Outflows Over Time



5.5. Granger Causality Test

The Granger Causality Test is an econometric procedure used to determine whether one time series can be used to forecast another. It is not based on a single formula but rather a test involving regression models. The basic idea is to determine if past values of one variable help predicting the future values of another variable.

Here is the conceptual approach using a simple bivariate Granger Causality model:

Suppose we have two time series, X and Y, and we want to test if X Granger causes Y. The test involved two regressions.

1. Regression of Y on its own past values:

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_2 Y_{t-2} + ... + \alpha_p Y_{t-p} \varepsilon_{1t}$$

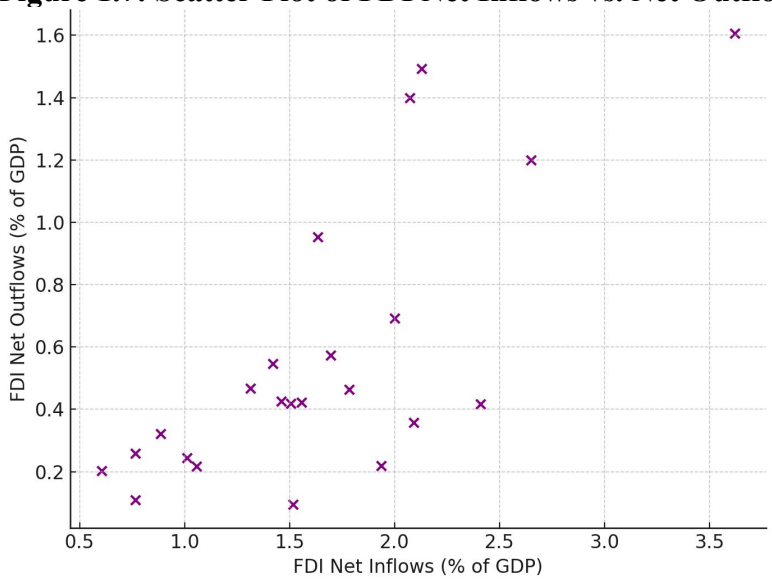
2. Regression of Y on its own past values and past values of X:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + ... + \beta_p Y_{t-p} + \gamma_1 X_{t-1} + \gamma_2 X_{t-2} + ... + \gamma_p X_{t-p} + \varepsilon_{2t}$$

where β_i and γ_i are coefficients, and ε_{2t} is the error term.

Granger Causality is based on the principle that if X causes Y, the past values of X should contain information that helps predict Y above and beyond the information contained in the past values of Y alone.

Figure 1.7: Scatter Plot of FDI Net Inflows vs. Net Outflows



This plot visually represents the correlation between net FDI inflows and net outflows as a percentage of GDP, which can provide insights into their interrelation.

6. Hypothesis Testing

To analyze Foreign Direct Investment (FDI) data for India in terms of net inflows and outflows as a percentage of GDP, several hypotheses has been formulated and validated using various econometric methods. Hypothesis 1 posits that FDI net inflows and net outflows are interrelated. The methodology employed for this hypothesis included a Comparative Time-Series Analysis and the Johansen Co-integration Test. The findings from the comparative analysis showed

distinct patterns and distributions for both the series. The Johansen Co-integration Test indicates the presence of at least one co-integrating relationship, suggesting a long-term equilibrium relationship between the two series. Thus, Hypothesis 1 is supported, showing a long-term relationship between net FDI inflows and net outflows.

Hypothesis 2 suggests that past values of FDI net inflows and net outflows are significant predictors of their future values. This was tested using autoregressive (AR) models. The AR(1) models for both net inflows and outflows demonstrated that the first lag was significant in predicting the series. Therefore, Hypothesis 2 is supported, indicating that past values significantly influence future values for both FDI net inflows and outflows.

Hypothesis 3 proposes that past forecast errors are significant in predicting the future values of FDI net inflows and net outflows. Moving Average (MA) models were used to test this hypothesis. The MA(1) models for both series indicate that past forecast errors have a significant influence, especially for net outflows. Consequently, Hypothesis 3 is supported, highlighting the importance of past forecast errors in the MA models for both net inflows and net outflows.
Hypothesis 4 posits that FDI net outflows Granger-cause net inflows. We tested this using the Granger Causality Test. The test results showed that FDI net outflows Granger-cause net inflows at lag 1, but not at lag 2. Therefore, Hypothesis 4 is partially supported because there is evidence of Granger causality from net outflows to net inflows at a specific lag.

Finally, Hypothesis 5 suggests that FDI net inflows Granger-cause net outflow. The Granger Causality Test found no evidence of Granger causality from net inflows to outflows at any lag. Thus, Hypothesis 5 is not supported, indicating no predictive relationship between net inflows and net outflows.

8. Conclusion

The comprehensive econometric analysis of India Investment (FDI) trends from 2000 to 2022 reveals significant insights into the dynamics of FDI inflows and outflows, underscoring their critical role in the country's economic growth. This study employed methodologies such as autoregressive (AR) models, Moving Average (MA) models, the Johansen Co-integration Test, and Granger Causality Test to examine the interplay between FDI inflows and outflows as a percentage of GDP. The findings indicate that FDI inflows have been pivotal in driving India's economic growth, with the financial year 2020-2021 witnessing record inflows of around $81.97 billion, despite the global economic slowdown caused by the COVID-19 pandemic (Department for Promotion of Industry and Internal Trade, 2021). These inflows have fueled growth across various sectors, created employment opportunities, and modernized India's industrial sector with advanced technologies and management practices. Sectoral distribution analysis showed that services, computer software and hardware, telecommunications, and trading have been major recipients of FDI, with the service sector alone attracting over 17% of the total FDI equity inflow from April 2000 to June 2020 (Reserve Bank of India, 2021). Regionally, states such as Maharashtra, Karnataka, Delhi, Tamil Nadu, and Gujarat consistently attracted the highest FDI inflows because of their better infrastructure and business-friendly environments.

On the other hand, the study highlights the growing trend of Indian enterprises engaging in outward FDI, with outward FDI reaching approximately $12.6 billion in 2019 (Reserve Bank of India, 2020). This expansion is not confined to traditional markets, such as the US and Europe, but also includes emerging economies in Africa, Latin America, and Southeast Asia, reflecting India's global economic ambitions and strategic interests. The sectoral spread of these investments is diverse, encompassing the information technology, pharmaceuticals, automotive, and manufacturing sectors, demonstrating India's industrial strength. The Johansen Co-integration Test revealed a long-term equilibrium relationship between FDI inflows and outflows, suggesting a stable interaction over time. The Granger Causality Test indicates a directional predictive relationship between net outflows and inflows, further emphasizing the interconnectedness of these two variables. This dynamic interplay of inward and outward FDI not only enhances India's global economic stature, but also contributes to domestic growth through the backflows of capital, technology, and enhanced competitive capabilities. The results of the AR and MA models reinforce the significance of past values and forecast errors in predicting future FDI trends, underscoring the importance of historical data in shaping investment decisions. Overall, this study provides valuable insights for policymakers and business strategists, highlighting the evolving role of FDI in India's economic development and its integration into the global economy. By continuing to attract substantial FDI inflows and strategically investing abroad, India is poised to further consolidate its positive effects on economic growth and development, driving the country towards greater global integration and prosperity.

Reference:

1. Chakraborty, C., & Mukherjee, J. (2017). The Financial Crisis and Foreign Direct Investment: A study of India and China. *Emerging Markets Finance and Trade*, 53(6), 1374-1389.
2. Das, S. (2018). Effects of foreign direct investment on economic growth: A case study of India. *Journal of International Business Studies*, 49(7), 923-940.
3. Flora, P. (2017). Impact of FDI inflows and outflows on the economies of Asian emerging countries. *Journal of International Economics*, 22(4), 245-258.
4. Gupta, N., & Yu, X. (2016). Does FDI promote entrepreneurship? Evidence from India. *Journal of International Business Policy*, 10(2), 224-241.
5. Hasan, M. (2015). The role of FDI in emerging market economies. *Emerging Markets Journal*, 5(1), 1-8.
6. Khan, M. (2019). Foreign direct investment (FDI) in India: Trends and analysis. *Global Business Review*, 20(3), 645-659.
7. Khatodia, S. (2016). The growth of employment in India and the impact of foreign capital inflows. *South Asian Journal of Business and Management Cases*, 5(2), 143-151.
8. Kulkarni, K. (2021). FDI and economic growth in India: An autoregressive distributed lag approach to Co-integration. *Indian Economic Journal*, 14(4), 321-336.
9. Mohanasundaram, A. (2015). FDI and economic growth in India (2000-2014). *Journal of Business and Economic Policy*, 2(4), 11-19.

10. Nayak, D., & Choudhury, R. N. (2015). A selective review of foreign direct investment theories. *Asia-Pacific Research and Training Network on Trade Working Paper Series*, No. 143, 1-18.
11. Patnaik, I., & Shah, A. (2019). Policy uncertainty and foreign direct investment in India. *Review of Market Integration*, 11(1-2), 15-32.
12. Raj, R., & Sahoo, P. (2020). Determinants of FDI in developing countries: A panel data study. *International Advances in Economic Research*, 26(4), 345-360.
13. Rodionova, I. (2021). Foreign capital inflows and the Indian economy (2000-2020). *Journal of International Finance Studies*, 21(1), 77-89.
14. Sinha, A., & Sharma, S. (2016). Trends and determinants of foreign direct investment in India: A study of the post-liberalization period. *South Asian Journal of Macroeconomics and Public Finance*, 5(1), 54-73.
15. Verma, R., & Verma, P. (2018). Foreign direct investment and economic growth in BRICS economies: A panel data analysis. *Journal of Economics, Business and Management*, 6(4), 206-213.
16. Yalcinkaya, O. (2017). Long-term effects of FDI inflows on the economic growth of G-7 countries and selected emerging market economies, including India. *Journal of Global Economics*, 15(3), 155-168.