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A Comparison of FDI, Stock Market and GDP of India

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Abstract: ***The primary goal of this study project is to look into the intricate links between Foreign Direct Investment (FDI), the performance of India's stock market, and the country's Gross Domestic Product (GDP). Our primary goal in researching these relationships is to obtain a better understanding of the critical role that FDI plays in shaping both stock market dynamics and India's overall economic growth and stability. This analytical investigation is based on a large dataset spanning the years 2015-2016 to 2020-2021. We used two statistical tools, correlation analysis and ANOVA (Analysis of Variance) calculations, to quantify these associations. With the use of these analytical tools, we aim to offer a deeper comprehension of how FDI affects India's stock market performance and, consequently, its overall economic health.***
Keywords: FDI, GDP, Growth, Stock Market, India

I. INTRODUCTION

A. *Foreign Direct Investment (FDI) in India*

In recent years, India has become more desirable to Foreign Direct Investment (FDI), demonstrating its commitment to economic reform and global integration. FDI is viewed as a crucial engine of economic growth, job creation, and technical advancement. This shift in FDI attractiveness in India may be traced back to its regulated policies prior to 1991, and the more liberal approach established with the Foreign Exchange Management Act (FEMA) in 1999. According to the United Nations Conference on Trade and Development (UNCTAD), India is the fourth most appealing destination for FDI in 2022, following China, the United States, and Indonesia. India's consistent economic development, a competent workforce, an investor-friendly environment, and the potential for strengthening numerous elements of the economy, such as infrastructure and technology transfer, have all contributed to this status.

B. *Stock Market of India*

The Indian stock market is one of the world's largest and most vibrant, as well as the oldest in Asia. It is Asia's third-largest stock market by market capitalisation, after China and Japan. The Securities and Exchange Board of India (SEBI) governs the Indian stock market. The two largest stock exchanges in India are the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). The BSE was formed in 1875 and is Asia's oldest stock exchange. The NSE is India's largest stock exchange in terms of trading volume. On the BSE and NSE, over 5,000 businesses are listed, covering a diverse spectrum of industries such as banking, finance, information technology, pharmaceuticals, and manufacturing. Reliance Industries, HDFC Bank, Infosys, and Tata Consultancy Services are among the major corporations listed on the Indian stock exchange.

In recent years, the Indian stock market has developed dramatically. The Indian stock market's market value has risen from $1 trillion in 2010 to more than $3 trillion in 2023. A lot of factors have contributed to this expansion, including strong economic growth, a growing middle class, and increased foreign investment.

C. *Gross Domestic Product (GDP) of India*

The Gross Domestic Product (GDP) of India is an important indicator of its economic health, representing productivity and performance. India's GDP has a complicated history. In the 1950s, it was mostly agricultural, with a low GDP. Economic reforms began in the 1960s, resulting in some but unequal growth. Comprehensive reforms fueled strong growth in the 1990s, with an annual GDP growth rate of 7% and significant poverty reduction. This economic expansion has continued into the twenty-first century, transforming India into one of the world's fastest-growing economies. However, difficulties like as poverty, inequality, and infrastructure problems continue. Nonetheless, India's young population, growing middle class and increasing global integration point to future GDP growth.

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II. REVIEW OF LITERATURE

1) *Impact of Inflation and GDP on Stock Market Returns in India by D. V. Lokeswar Reddy:* This study examines the influence of Real Gross Domestic Product (RGDP), Interest Rate (INT), and Inflation Rate (INF) on stock prices of quoted companies (1997-2009). Findings suggest that lower inflation and interest rates positively affect stock prices, while higher RGDP also has a positive impact. It is recommended that governments implement policies to reduce inflation and maintain moderate interest rates to stimulate stock market activity and investment. The explanatory variables explained 95.6% of the variation in stock prices.
2) *Exploration of Relationship between FDI and GDP:* A Comparison between India and Its Neighbouring Countries by Pooja Sengupta and Roma Puri: This study examines FDI patterns in the Indian subcontinent, including Pakistan, Nepal, Bangladesh, and Sri Lanka, revealing a positive association between FDI and GDP, influenced by distinct economic policies. FDI emerges as a significant driver of economic growth in these nations.
3) *Factors Affecting GDP (Manufacturing, Services, Industry): An Indian Perspective by Dhiraj Jain, K. Sanal Nair and Vaishali Jain:* Using data from the Economic Survey of India and Reserve Bank of India bulletins, this study investigates the influence of several macroeconomic factors on GDP components from 2000-2001 to 2011-2012. Except for the service sector, the analysis shows that FDI, Net FII equity, and Imports have a considerable impact on GDP components, whereas Net FII debt and Exports have no significant impact.

III. RESEARCH GAP

While there is a considerable amount of study in the academic and economic sectors on specific aspects of FDI, stock market performance and GDP, the collective understanding of their interrelationships remains fairly limited. While it is well acknowledged that FDI has an impact on both GDP and the stock market, there is still a significant gap in understanding the detailed relationships and probable causality between these three essential economic variables.

IV. OBJECTIVE OF THE STUDY

The aim of this study is to assess the extent to which changes in Foreign Direct Investment (FDI) affect fluctuations in India's stock market and GDP. It also aims to determine whether there is any visible relationship between FDI, GDP, and the stock market.

V. RESEARCH METHODOLOGY

To analyze the collected data, two valuable statistical tools employed are the coefficient of correlation and ANOVA (Analysis of Variance). The data used in this study has been sourced from the World Bank Data and the Bombay Stock Exchange (BSE), covering the period from 2015-2016 to 2020-2021.

Correlation is a statistical metric used to assess the strength and direction of the relationship between two variables, represented by a coefficient ranging from -1 to 1. A coefficient of 1 indicates a perfect positive correlation, while -1 signifies a perfect negative correlation; 0 suggests no apparent connection. Correlation coefficients are valuable for uncovering hidden links between variables and can aid in predictive modelling. However, it's crucial to note that correlation doesn't imply causation; a correlation merely indicates an association, without proving that one variable causes change in the other.

ANOVA, or Analysis of Variance, is a statistical approach that compares the means of two or more groups to see whether there are any significant differences. The primary hypothesis tested by ANOVA is whether there is a statistically significant difference in the means of the groups being compared. In ANOVA, there are two sorts of hypotheses:

Null Hypothesis (H_0): In ANOVA, the null hypothesis implies that there is no significant difference between the group means. In other words, all groups are equal, and any variations detected are the result of random chance.

Alternative Hypothesis (H_1): The alternative hypothesis asserts that there is a statistically significant difference between at least one pair of groups under consideration.

The test statistic is used in ANOVA to compare the observed variance between groups to the variance within groups. If the calculated F-statistic from this analysis differs significantly from what would be expected by random chance (as determined by a critical value or p-value), the null hypothesis is rejected in favour of the alternative hypothesis, indicating that there are indeed significant differences between the group means.

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VI. RESULTS AND DISCUSSIONS

A. *BSE SENSEX and FDI*

Table 1: Value of BSE SENSEX and FDI

Year	BSE SENSEX			FDI (USD Billion)		
	Index	YoY Change	Increase %	Inflow	YoY Change	Increase %
2020-2021	49509.2	20040.66	68.0%	64.36	13.75	27.17%
2019-2020	29468.5	-9204.42	-23.8%	50.61	8.49	20.16%
2018-2019	38672.9	5704.23	17.3%	42.12	2.15	5.38%
2017-2018	32968.7	3348.18	11.3%	39.97	-4.49	-10.10%
2016-2017	29620.5	4278.64	16.9%	44.46	0.45	1.02%
2015-2016	25341.9	-2615.63	-9.4%	44.01	9.43	27.27%
2014-2015	27957.5	-	-	34.58	-	-

Table 2: Correlation between BSE SENSEX Increase % and FDI Increase %

	BSE SENSEX	*FDI*
BSE SENSEX	1	
FDI	0.0662	1

The correlation value of 0.0662 indicates that the BSE SENSEX and FDI have a weak positive link. This implies that these two variables have a modest propensity to move in the same direction, implying that if the BSE SENSEX rises, so does FDI, and vice versa. This association, however, is weak, and the link between the two variables is most likely impacted by other factors.

B. *FDI and GDP*

Table 3: Value of FDI and GDP

Year	FDI (USD Billion)			GDP (USD Billion)		
	Inflow	YoY Change	Increase %	Value	YoY change	Increase %
2020-2021	64.36	13.75	27.17%	2,671.60	-164.01	-5.78%
2019-2020	50.61	8.49	20.16%	2,835.61	132.68	4.91%
2018-2019	42.12	2.15	5.38%	2,702.93	51.46	1.94%
2017-2018	39.97	-4.49	-10.10%	2,651.47	356.67	15.54%
2016-2017	44.46	0.45	1.02%	2,294.80	191.21	9.09%
2015-2016	44.01	9.43	27.27%	2,103.59	64.46	3.16%
2014-2015	34.58	-	-	2,039.13	-	-

Table 4: Correlation between FDI Increase % and GDP Increase %

	FDI	*GDP*
FDI	1	
GDP	-0.8173	1

FDI and GDP have a substantial negative correlation with a value of -0.8173, indicating a significant adverse association. When GDP rises, FDI tends to fall, and when GDP falls, FDI tends to rise. This implies that changes in FDI are negatively connected to changes in GDP.

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C. ANOVA between BSE SENSEX Increase %, FDI Increase % and GDP Increase %

H_0: There is no difference in the mean increase between the groups.

H_1: There is a difference in the mean increase between at least of the groups.

Table 3: Value of FDI and GDP

Year	BSE SENSEX Increase %	FDI Increase %	GDP Increase %
2020-2021	68.0%	27.17%	-5.78%
2019-2020	-23.8%	20.16%	4.91%
2018-2019	17.3%	5.38%	1.94%
2017-2018	11.3%	-10.10%	15.54%
2016-2017	16.9%	1.02%	9.09%
2015-2016	-9.4%	27.27%	3.16%

SUMMARY				
Groups	*Count*	*Sum*	*Average*	*Variance*
BSE SENSEX Increase%	6	0.8034	0.1339	0.0983
FDI Increase%	6	0.7090	0.1182	0.0236
GDP Increase%	6	0.2886	0.0481	0.0051

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.0250	2	0.0125	0.2955	0.7484	3.6823
Within Groups	0.6354	15	0.0424			
Total	0.6605	17				

To evaluate the ANOVA table, we first look at the F-statistic for the cause of variance across groups. The p-value is 0.7484, and the F-statistic is 0.2955. We cannot reject the null hypothesis (H_0) because the p-value is greater than 0.05. We can also examine the mean squares for the sources of variance between and within groups. The mean square of the difference between groups is 0.0125, and the mean square of the difference within groups is 0.0424. The mean square difference across groups is less than the mean square difference within groups. This suggests that within-group variability is greater than between-group variability.

VII. CONCLUSION

The relations between FDI inflows and GDP and between stock market indices and FDI differ for several reasons. FDI inflows, while contributing to GDP, represent just one component of a country's economic activity, alongside domestic investment, consumer spending, and government expenditure. Their relationship can also fluctuate significantly due to factors like global economic conditions, political stability, and investment policies, with a potentially stronger impact on GDP growth in developing countries. Nevertheless, it is crucial to acknowledge that correlation and ANOVA alone do not establish causation, and further analysis is required to uncover the underlying dynamics and potential causal relationships among these variables.

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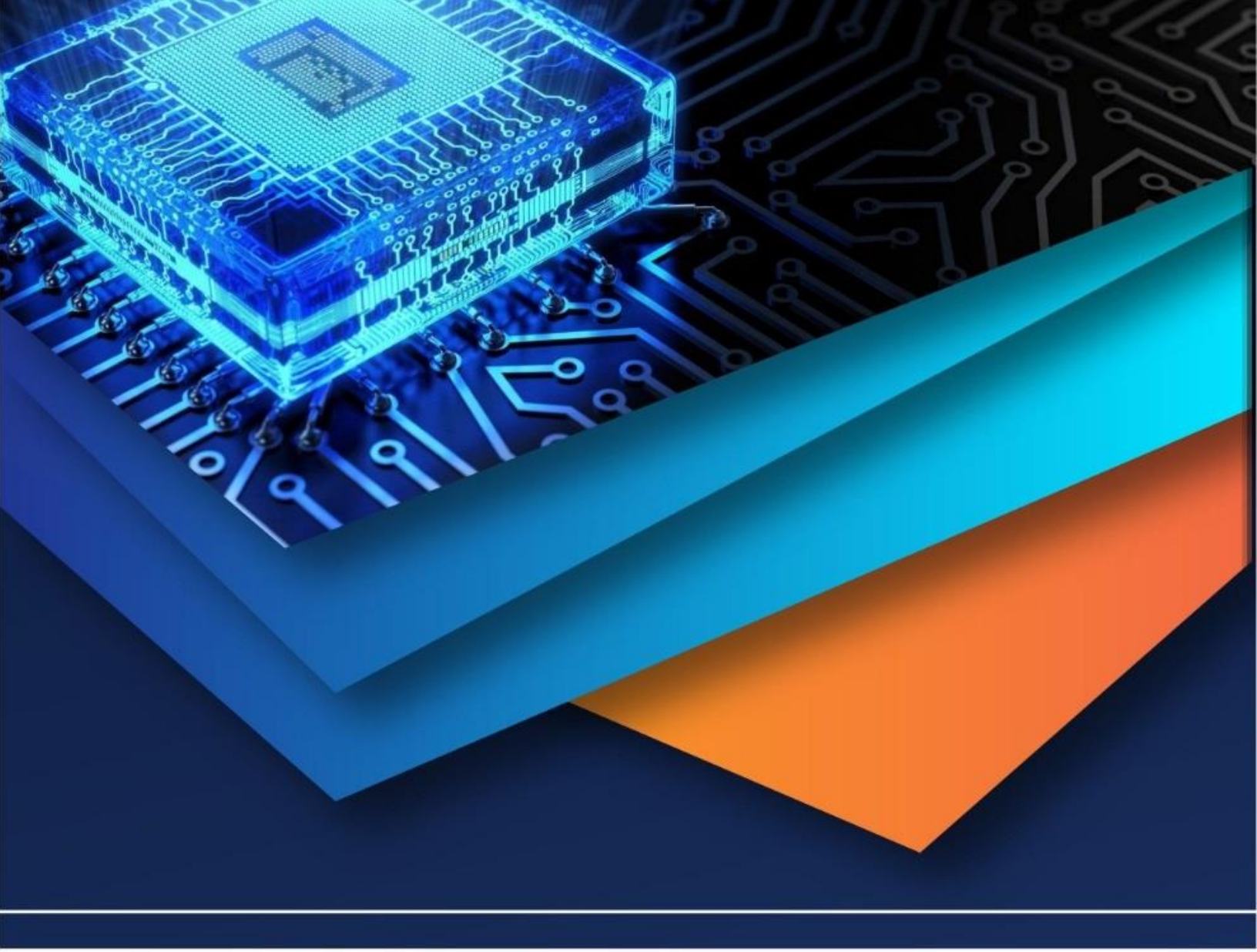
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