Analyzing the Interplay between Economic Growth Rate, GDP Per Capita, and Stock Market Performance in India: A Case Study of the BSE Index

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ABSTRACT

The paper discusses the connection between GDP per capita and economic growth from 1980 to 2022, which has had a positive influence on growth of Indian stock markets. The study is based on the real GDP growth rate, which has to be considered as an economy's growth. The effects of the study show that, in relation to stock price performance, a causal link has been established between GDP growth rates and GDP Per capita. The purpose of this study is to explore the historical link between economic growth rates and GDP Per Capita on stock market performance in India, as well as changes influencing investor sentiment and future behaviour on the Stock markets. The persistence of this research is to analyse the long term connection involving Bombay Stock Exchange and macroeconomic variables. It analysis a multiple regression equation model to explore the interactions among these factors. The regression model shows that the independent factors account for a significant influence, explaining 83.4% of the variation in the dependent variable, which is the BSE index. The result shows that there is the strong positive correlation between GDP Per Capita and BSE index. Similarly, there is the weak positive correlation between Economic Growth Rate(EGR) and BSE index. The research's conclusions inform investment plans and assist interested parties in formulating policies.

Keywords: - Correlation Analysis, Economic Growth Rate, GDP Per Capita, Regression, Variance Inflation Factor.

1. Introduction:

Economic growth rate (EGR) is a vital Measure of a country's financial health and accomplishment. It measures the change in total value of merchandise and services caused in a country between two time periods. The distinguishing growth rate changes established the amount of change in result over period - higher EGR displays faster economic growth while lower or negative progress way slower or declining output. Overall, EGR characterizes a country's economic progress by comparing its total result and earnings growth between various periods. It determines a main metric of a nation's economic advancement. For the purpose of measuring the comparative condition of an economy over time, GDP growth rates shall be used. These numbers are collected and reported on a quarterly or annual basis (Fernando, 2023). India's GDP growth reached a record 7.2 percent in 2023, making it the world's largest economy. Strong service sector performance and strong consumption growth, in addition to a recovery

from the COVID virus that impacted the economy throughout 2020 and 2021, have contributed to India's GDP growth rate. In 2023, India's nominal GDP is estimated to reach $3.75 trillion making it the fifth biggest economy in the world.(World Bank, 2023)

Gross Domestic Product per capita is a degree got by separating a country's GDP by its total population. In the following table, nations general are ordered established their GDP per person at Purchasing Power Parity, and it further contains the Nominal GDP per capita. GDP is the total profit of all merchandise and duties caused in a given country over a likely period, ordinarily a period or a quarter. Due to the offering of earnings and money built apiece saving, GDP per capita is frequently believed as an evidence of a country's level of material comfort (Worldometer, 2023).

The stock exchange is a place where people can trade shares of publicly trade companies. In a company, shares are units of ownership which provide shareholders with the right to claim its assets and profits. The market allows investors to play a part in the growing and development of various sectors or industries, as well as diversify their portfolio and reduce risk. In addition, companies have access to capital and liquidity which may help them expand their activities and create a greater level of value for stakeholders on the stock market.(Stock Market Library, 2020)

2. Statement of the problem:

The stock market is one of the most major issues for the 21st century generation as it is a reflection of the financial health of a country.(Academies Press, 2023) The connection between India's stock exchange performance and GDP per capita and financial progress is still confused, though. The stock markets in India are from extreme volatility, that is a matter of excellent worry for both financiers and procedure makers. The purpose of the research is to define the basic determinants moving the stock exchange, with a focus on the effects of GDP per person (GPP) and financial growth rate. It's critical to understand how investors behave in the stock exchange. Because they rest on so heavily on news from brokers and important investors, many investors lack sufficient understanding of the stock exchange. Making smarter investing determinations can benefit financiers, policy makers, and investigators by having a better understanding of the variables behind stock exchange evaporation. The idea that "finance" is essential to economic progress is supported by the extending significance of capital markets everywhere. Stock market growth relates to economic growth, and this correlation is still relevant to examine. The performance of the stock exchange is an significant indicator of a country's stability and happenings.

3. Objectives of the study:

The empirical analysis in this study proposed to clarify how GDP growth and GDP per capita influence India's Bombay Stock Exchange performance. The study particularly checked the connection between GDP per capita and the Indian stock market, in addition to between financial growth rate and the Indian stock market. This was done to measure how these key macroeconomic determinants relate to and impact the country's major stock index.

4. Limitations of the study:

This research specifically focuses on how GDP per capita and Economic Growth rate impact the stock market in India. As we concentrated only on India, the results of this study might not be relevant in every nation. For this study, we have used the most recent data gathered and its accuracy is dependent on the credibility of these data sources. This study focuses solely on the Bombay Stock Exchange (BSE) in India

and doesn't consider other macroeconomic factors like GDP, inflation, foreign direct investment, remittances, dividends, exchange rates, political events, or natural disasters, even though these factors can also influence the stock market. Additionally, India has multiple stock exchanges, but this research concentrates exclusively on BSE.

5. Literature Review:

The issue of stock markets has been explored by a number of researchers who examined how various macroeconomic factors such as economic growth rates, GDP per capita, exchange rates and interest rate volatility affect the overall market performance. A series of relevant studies that demonstrate the link between these macro variables and stock prices will be reviewed by the next sections.

(Kushwaha et al., 2023) This study highlights the importance of Gross Domestic Product (GDP) and inflation in shaping stock market performance. Studies commonly show a encouraging correlation between GDP growth and stock prices, while the relationship between inflation and stocks is more nuanced, with some indicating a negative impact due to its effect on purchasing power and interest rates. However, further research is required to comprehensively understand how these macroeconomic factors interact with others, such as interest rates, remittances, and dividends, to influence stock market dynamics. Integrating additional variables and advanced methodologies can enhance our understanding and inform better decision-making for policymakers and investors.

(Arsad & Khalid, 2021) This study investigates the association among financial development and stock exchange integration in 32 Asian and European countries. Although worldwide market integration has happened on the rise in current decades, there has been little consensus on the impact it has on financial development. To deal with this, a stock market integration (SME) index is established utilizing the Kalman Filter methods, and the correlation between SME integration and economic progress is evaluated utilizing heterogeneous committee models. The judgments show that in extreme-earning nations in Asia and Europe, the combination of SMEs has a advantageous affect financial progress. However, the positive impact is not as evident in middle profit Asian nations, signifying that these nations may not able to have or do harvest the full benefits of market integration. This highlights the need for country-specific liberalization procedures that are tailored to the business-related context and geographic location of these nations.

(Radikoko et al., 2019) This study looks at how stock exchange development impacts financial development. The country ambiguous is Botswana and the study is established data covering 2006 to 2016 using the ARDL bounds model. Market capitalization ratios for market size, shares traded ratios for liquidity, and turnover ratios for market size can all be used to show the growth of the stock exchange. One way to gauge economic development is to look at the real GDP development rate. It may have demonstrated that turnover ratio and market capitalization have a negative connection with economic growth, but exchange share value has a strong positive association with commercial developments. Therefore, it maybe visualized that liquidity can have a positive affect financial progress in a country like Botswana. Recommendations The government should look into policies to attract domestic investors to the stock market. This could lead to more investment activity on the stock exchange and improve liquidity in the country.

(Osaseri & Osamwonyi, 2018) This analyze the relationship among stock market success and economic progress in the BRICS countries using quarterly data from the World Bank Indicator database from 1994Q1 to 2015Q4. The study uses Panel Least Squares accompanying established effects to speculate

how the growth of stock exchanges influences the BRICS nations' monetary development. Robustness and strength of the regression results were verified through diagnostic tests. The results signify that stock market development has a meaningful helpful affect the business-related growth of these nations. In essence, skilled is a advantageous link between stock market progress indexes and the economic progress of BRICS. As a recommendation, the study suggests that the governments of BRICS member countries should address the weaknesses in their respective economies and rapidly implement strategies to help them.

(Durusu-Ciftci et al., 2017) This Paper follow scrutinize the link between economic development and monetary growth, both theoretically and tentatively. In the hypothetical part of the study, we request a development model that involves economic markets. This model demonstrates that borrowing from the credit markets and investing in stocks from the stock markets are two of the factors that influence a country's earnings per capita over time. The study's practical examines data from 40 countries from 1989 through 2011. We argue that while both credit and stock markets have an ongoing favourable influence on a country's business-related well-being, credit markets play a more significant role. We recommend that policy makers focus on strengthening and expanding their country's financial markets by improving the legal and institutional frameworks that protect creditors and investors. This can help to accelerate economic growth by expanding the financial sector.

(J.N et al., 2016) analyse the practical study resolved the force of Nigeria's capital market on enchantment monetary growth and economic growth from 1981 to 2014 utilizing annual period sequence data and Vector Error Correction models. The outcomes presented that growing market funding, filed bond principles, workforce support, gross savings, and capital establishment had meaningful positive belongings on Nigeria's financial progress over the study ending. This desires that procedures proposed at expanding Nigeria's capital markets commit support better monetary growth and financial progress in the country. The study approves constructing an surroundings that promotes investment convenience for two together local and worldwide financiers to solve the full potential of the capital market. Additionally, reconstructing the Nigerian trading system to reinforce share liquidity is crucial for the stock exchange's influence.

(Khetsi, 2015) This study resolved the connection between capital markets and fiscal growing in South Africa from 1971-2013. The results imply a positive connection between economic development and the closeness of capital markets. The research highlights determinants that support capital retail growth, like monetary organizations. Overall, the study determines observations into the connection among monetary growth and capital markets, particularly in South Africa, home to a major stock market.

(Masoud, 2013) The goal of this study is to establish whether a robust stock market contributes to a country's economic growth. Different analysts have various views on this argument. Some contend that stock markets are main cause they facilitate the buying and selling of property, the collection of capital, the monitoring of companies, and the mitigation of risks. Recent research suggests a definite correlation between a healthy stock exchange and financial growth in both the short and long-term. It seems that stock markets indirectly influence economic development by stimulating investment. Simply put, stock markets appear to perform a service that provides to financial progress, that concurs accompanying theory and prior research.

(Nazir et al., 2010) This article investigates the connection among the development of Pakistan's stock market and monetary development from 1986 to 2008. It focuses on two key signs of stock market progress: display magnitude (as a proportion of GDP) and market funding (as a portion of GDP), apart

from total exchange share worth (TSTV value as a rate of GDP). Our results indicate that increasing two together the intensity and stock exchange funding of the stock markets of arising markets in the way that Pakistan can cause success business-connected growth.

5.1 Research Gap

A review of the literature on the impact of macroeconomic conditions on stock market performance yielded varied results. A review of selected literature reveals discrepancies across studies due to differences in methodology, variables examined, time periods covered, and analytical techniques used. The lack of agreement highlights the need for additional study to thoroughly investigate the relationship among key macroeconomic factors and stock market performance. Additional research using consistent methods and variables would help provide clearer insight into this relationship.

6. Methodology

This Paper is based on Correlational research design to realize the goal of this research, data for GDP Per Capita, Economic Growth Rate, and the BSE Stock Index were assembled from websites like www.macrotrend.net (Macrotrends, 2023) and www.bseindia.com.(*Historical - Indices*, n.d.) To analyse these data, a multiple regression model was selected. In this model, GDP Per Capita (X1) and Economic Growth Rate (X2) acted as independent variables, while the BSE Stock Index (Y) served as the dependent variable. The model was reconstructed into logarithmic form as $Ln\,Y = \alpha + \beta1 LnX_1 + \beta2 LnX_2 + e$ because the primary analysis showed a nonlinear connection between the variables, which became linear after applying normal logarithms. The study spanned 42 years and followed a correlational research design. Statistical tools, containing correlations and regression analysis, were utilized, and SPSS Version 25 software was working. Yearly data were analysed to establish correlations between GDP Per Capita, Economic Growth Rate, and the BSE index. Various statistical measures, such as correlation coefficients, regression analysis, and ANOVA, were working to investigate relationships between the variables and draw conclusions from the analysis.

7. Finding and Discussion

The study passed to resolve the collected and treated data using SPSS software, evaluating key necessities for regression analysis, that is to say linearity and normality. This study was before carried out engaging various statistical tools, containing the coefficient of variation, correlation coefficient, regression analysis, and ANOVA, all of that were appropriated to solve the study's established aims.
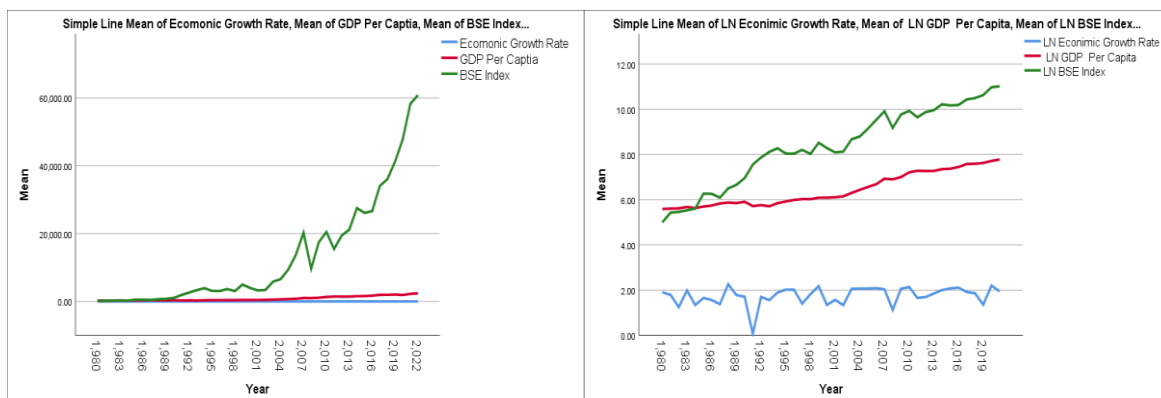
Sources: Author

Figure 1: Trend of LnEconomic Growth, LnGDP Per Capita, LnBSE Index

After applying natural logarithms to the data, a trend line graphically depicting the variables shows a linear connection between GDP Per Capita, Economic Growth Rate, and the BSE index. Furthermore, the trend line measure that GDP Per Capita is rising, yet the Economic Growth Rate is not constant. This suggests that the BSE index rises in parallel with an increase in GDP per capita.

Correlation Analysis:

Correlation study is a design active to judge the importance and direction of the association between diversified variables, quantifying in consideration of their relationship. The measure of this connection is the natural correlation coefficient, denoted by "r" and varying from -1 to +1. The main objective concerning this research search out evaluate the influence of microeconomic determinants on the Bombay Stock Exchange (BSE). The examination begins accompanying a correlation analysis in this study.(Kafle, 2019)

Table 1: Correlation Analysis model summary of India

Correlations		LNGPC	LNEGR	LNBSE
LNGPC	Pearson Correlation	1	0.313*	0.917**
	Sig.		0.043	0.000
	N		42	42
LNEGR	Pearson Correlation		1	0.289
	Sig.			0.063
	N			42
LNBSE	Pearson Correlation			1
	Sig.			
	N			

Sources: Author Calculation

Table 1 presents the nature, direction, and importance of the correlations between the study variables. The equivalences are statistically significant at the 0.05 level established the equivalence coefficients. There is a strongly positive equivalence between GDP per capita and the BSE index, signifying that the BSE index increases as GDP per capita rises (r=0.917, p<0.05). This finding is similar to (Verma & Bansal, 2021) gross domestic product have a positive effect on both emerging and developed economies' stock market. The results demonstrate a slight positive equivalency between economic growth rate (EGR) and the BSE index (r=0.289, p>0.05), implying that EGR has a lower impact on the BSE index. Overall, the macroeconomic variables examined significantly influence the BSE index.

ANOVA

ANOVA was used to examine the implication of the regression model that included the financial development rate and GDP per capita as independent factors and the BSE index as the dependent Factors. Applying ANOVA helps legalize either the model is statistically important overall. (Kafle, 2019), The ineffective interpretation for the ANOVA is that the regression show is not significant. If the ANOVA returns a meaningful result, it displays the model is meaningful in describing the connection between the independent macroeconomic determinants and the stock exchange index.

Table 2: ANOVA table

ANOVA						
		Sum of Squares	DF	Mean Square	F	Sig.
	Regression	101.600	2	50.800	97.778	0.000
	Residual	20.262	39	0.520		
	Total	121.863	41			

Sources: Author Calculation

The ANOVA results in regression study reveal a p-value below 0.01, indicating the model's high significance at a 1% level. Consequently, the model is appropriate for predicting the BSE index using GDP Per Capita and Economic Growth Rate. In summary, the overall end is that the model is a valuable for BSE forecasting. (See Table 2)

Regression Analysis

Regression analysis serves two purposes: first, it assesses how independent factors affect a dependent factor, and second, it forecasts the value of the dependent factors built on known independent variables. It comes in two types: Bivariate Regression for one dependent and one independent variable, and Multiple Regression for situations with more than two variables, one being dependent and the others independent. This study employs Multiple Regression to understand how independent variables influence the dependent variable.

Table 3: Model of Regression Analysis

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	0.913	0.834	0.825	0.72080

Sources: Author Calculation

In Table 3 explain that GDP per capita and Economic Growth Rate account for 83.4% of the variation in the BSE index, as indicated by the R-squared value. The remaining 16.6% of unexplained variance is attributable to different unspecified determinants. The predictable difference of the estimate, that measures the accuracy of predictions, is 0.7208 for this model. This This relatively low standard error implies that the model's predicted values are reasonably close to the actual observed BSE index values. Overall, the high R-squared and low standard error suggest this model has strong explanatory power and reliably predicts movements in the BSE index based on these two key macroeconomic factors.

Histogram
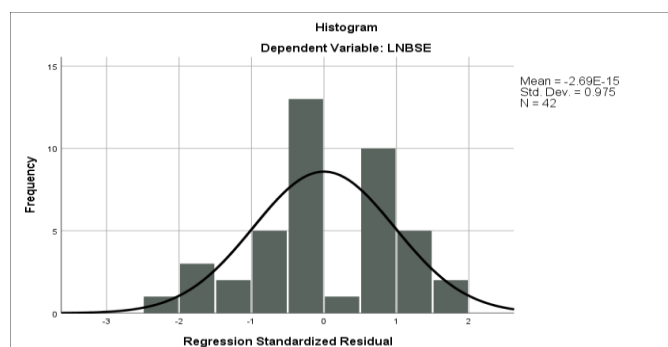
Sources: Author Calculation

When examining the distribution of residuals in a histogram, it becomes evident that the errors understand a normal distribution pattern. This satisfies another essential requirement for a valid linear regression model. Consequently, the model is regarded acceptable for use.

Regression Model

Regression research is a established of statistical approaches used to control the link among one or more independent factors and a dependent factors. It grants shaping of the potential future association middle from two points these variables. Regression evaluation is used to determine the strength of the links among the liberated and weak variables.(Taylor, 2020) As explained by Professor Jan Hammond of Harvard Business School, regression study is used to understand the nature of relationships and how closely data conforms to them. It may be valuable for predicting trends and forecasting based on classical data. The dependent factors is plotted on the Y-axis and the freed factors is plotted on the X-axis in a scatter plot. The regression equation specifies the link between the variables and quantifies the margin of error. The regression line is the line that most closely fits the data points. Regression analysis enables modeling and measurement of associations between variables.(HBR, 2021)

Table 4: Regression Model, test of regression coefficient and collinearity test

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
	(Constant)	-5.343	1.005		-5.314	0.000		
	LNGPC	2.123	0.160	0.912	13.264	0.000	0.902	1.109
	LNEGR	0.015	0.295	0.004	0.051	0.959	0.902	1.109

Dependent Variable: LNBSE

Sources: Author Calculation

Table 4 displays the outcomes for the independent factors GDP Per Capita (X1), Economic Growth Rate (X2), and the constant (α). In this study, we have set the significance level at 0.01, which corresponds to 1%. The derived multiple regression equation for these two independent variables is as follows:

The regression analysis shows the regression model is as:

$Y = α + β1LnX1 + β2LnX2 + e$ ----------------[Equation i]

Ln(BSE) = -5.343 + 2.123 × Ln(GDP Per Capita) + 0.015 × Ln(Economic Growth Rate) + e --------- [Equation ii]

If GDP Per Capita increases by 1% then BSE index increase by 2.123 i.e 2.123 % keeping the other factor or variables remains constant. It's significant between the among variables so, chances of error is only 0.000 i.e (0.000 <0.01). If Economic Growth Rate increases by 1 % then BSE index Increases by 0.015% keeping the other variables remains constant. There is the chance of error is 0.959 i.e. 95.9% , it is insignificant between the variables. so, Economic Growth rate variable is not effective for BSE index. Similarly, If GDP Per Capita and Economic Growth rate remains Zero then the BSE index decreases by 5.343 i.e 5.343%, which means other factor are affecting the stock market, it's significant between the variables There is less chances of error is 0.000 which is less than 1%. so, other variables are effective for BSE index. Like:- GDP, Inflation ,Interest rate, Gold Price, foreign institutional investment, FDI, etc. In

this table t-test or prob (sig) value provide the individual effect to dependent variables. The standardized coefficient is an attempt to make the coefficient more comparable.

The independent variables do not exhibit collinearity, as indicated by the regression analysis findings, which show that all of the Variance Inflation Factor values are less than 5. The third multiple linear regression assumption is satisfied by this. In the conclusion, the regression model's ability to accurately forecast the BSE based on GDP per capita and Economic Growth rate is demonstrated by the lack of multi collinearity with the independent variables.

8. Conclusion:

This study adds to our understanding of the long-term association among economic growth, GDP per capita, and the Indian stock market. The investigation resolved macroeconomic data from 1980-2022, look at correlations and conducting regression analysis between GDP per capita, economic growth rate, and the BSE stock index. The overall model granted a significant relationship among the variables. According to regression examination, GDP per capita and economic growth rate explained 83.4% of the variation in the BSE index. The correlation investigation revealed the relationships between the variables. There was a forceful definite equivalence between GDP per capita and the BSE index, meaning the index rises as GDP per capita increases. In contrast, just a small positive link was seen between the economic growth rate and the BSE index, indicating a minimal impact. The findings show that macroeconomic factors have a significant impact on the BSE index. The regression coefficients show a statistically important link between GDP per capita and the index. In contrast, just a small positive link was seen between the economic growth rate and the BSE index, indicating a minimal impact. The results show that macroeconomic factors have a significant influence on the BSE index. Furthermore, GDP per capita and the BSE index are highly interconnected, with GDP playing a pivotal role in predicting market trends. The connection between business-related progress and the BSE index is weaker, with a 95.9% margin of error. Economic growth rates and GDP Per Capita can influence the stock market through various channels, including consumer and investor confidence, global dynamics, government policies, market sentiment, GDP impact, wealth effects, interest rate ramifications, and foreign direct investment (FDI). However, the stock market is also subject to a myriad of other influences, such as political developments, global trends, corporate news, and more. Thus, prudent investment decisions require careful consideration of this wide array of factors.

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