

# Exploring Long Run Relationship Between Gross Domestic Product And Stock Market Performance In India

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**Abstract:** *The Financial Market plays a crucial role in making up a well-functioning financial system. It is made up of several sub-components, the Capital Market being one of them. The growth in the financial market stimulates growth in the financial system which in turn induces growth in the economy.*

*The economy of India has observed strong economic growth. For the Financial Year (FY) 2022-23, India's GDP growth accelerated to 7.2% amid global uncertainties. It aided India to become the fifth-largest economy in the first quarter of FY 2022-23 leaving the United Kingdom behind, after withstanding repeated waves of COVID-19 pandemic shock. India has also recorded all-time high foreign exchange reserves of USD 645 billion in October 2021. The Indian Stock Market Index (BSE SENSEX) hit an all-time high and rallied to 62,245 points in October 2022 as well. Can this be described as a simple coincidence? These events motivated us to study whether the long run movement of Indian Stock Market Indices is due to the effect of select macroeconomic variables namely the Gross Domestic Product (GDP) at Constant Prices and Gross Domestic Product (GDP) at Current Prices. The study is conducted from the period 1995 to 2022, which incorporated BSE SENSEX and NSE NIFTY50 as the dependent variables to appear for the Indian Stock market and Gross Domestic Product (GDP) both at Constant Prices and at Current Prices as independent variables. The study applied simple linear regression analysis to report the findings of our research.*

**Keywords:** GDP Current Prices, GDP Constant Prices, BSE Sensex, NSE Nifty, etc.

## INTRODUCTION

The Indian Capital Market is far stronger and better today as compared to the periods just after Independence. In 1956, when India opted for 'industry' as its prime moving force, it was confronted with the issue of raising long-term funds for industrial establishments and their expansion. Though India was having banks but they were weak, small, and geographically unevenly distributed, therefore the upcoming industries could not be financed through them. To support the capital requirement, the government came up with different types of financial institutions or segments in the later years. The Indian Security market or Stock Market became one of the segments of the Indian Capital Market that influences the economic activities of India particularly industrial activities (Ray and Sarkar, 2014). The stock market movement in India seemed to be propelled by the performance of industries in the domestic market rather than that of the export market (Ahmed, 2008). It is counted as the most attractive and vibrant share market in the world.

India has two major types of stock exchanges namely the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). BSE is the biggest in India and is measured as the world's 10<sup>th</sup> largest stock exchange (as of November 2022) with an estimated market capitalization of around \$1.7 trillion; NSE is the world's largest derivatives exchange (in terms of volume of the contracts). Both BSE and NSE are extensively used by investors as a barometer of the Indian Capital Market. In recent times, the BSE Sensitivity Index (SENSEX), hit an all-time high and rallied to 62,245 points in October 2022. But on March 31<sup>st</sup>, 2020, SENSEX took a dip of 31.1768% which stood at 29,468.49 points due to the impact of CoronaVirus. The COVID-19 outbreak resulted in a loss of 27.31% of the total stock market since the initiation of the year 2020. However, the early interventions made by the government rescued India from entering into worse situations. Otherwise, if the lockdown would have increased, as it took a longer time to find coronavirus medicine, more time the Indian stock market would take to get back on track (Dhillon et al., 2021).

India has evolved as a rapidly-booming major economy in the world. The strong economic growth aided it to become the fifth-largest economy in the first quarter of FY 2022-23 leaving the United Kingdom behind, as it recovered from repeated waves of COVID-19 pandemic shock. India recorded all-time high foreign exchange reserves of USD 645 billion in October 2021. However, the journey of the Indian Economy has not been smooth and easy. The economy of India faced a massive crisis in early 1991 due to colossal and persistent macroeconomic imbalances since the 1980s (Nayyar, 1993). At the outset, the Gulf War caused an increase in world oil prices that influenced a sharp drop in the remittances of migrant workers, accompanied by an

outflow of foreign currency which collectively aggravated the foreign exchange crisis (Pathak, 2008). The consistent growth in the gap between government income and expenditure resulted in escalating fiscal deficits. The current account deficit doubled from an annual average of \$2.3 billion in the first half of the 1980s, to an annual average of \$5.5 billion during the second half of the 1980s. The persistent deficits were inevitably financed by external borrowing which further amplified the perils for the economy. The Reserve Bank of India pledged 47 tonnes of gold with the Bank of England to raise \$405 million. By dint of that, India's debt service burden rose from 10 percent of the current account receipts (in 1980-81) to 22 percent of current account receipts (in 1990-91). It experienced one-liquidity crisis from mid-January 1991 to another in late June 1991. In response to the crisis, the Rao Administration embarked on a wide range of adjustments and reforms including a reduction in import tariffs, the rupee was devaluated by 20% to enact measures for fiscal and monetary tightening. The desire was to extricate the Indian economy from the mess in general and to stabilize the macro-economic environment in specific.

A well-developed financial market is a prerequisite for the creation of an efficient financial system that facilitates a higher rate of economic growth. The strength of an economy is determined by the soundness of the financial system. Therefore, the role of the capital market is to mobilize resources towards more productive uses to increase the output of the economy. The present study aims to explore the long run relationship between the stock market indices (BSE SENSEX and NSE NIFTY50) and the selected macroeconomic variables (GDP at Constant Prices and GDP at Current Prices) and to the extent they are correlated. Our period of study is from 1995 to 2022; i.e., for about 27 years to explore the long run relationship between GDP and Stock Market Performance in India as no or very little research work has been conducted for such a long period to the best of our knowledge.

## REVIEW OF LITERATURE

Many industrial researchers, practitioners, and financial analysts have conducted empirical studies early to examine the effect of the stock price on macroeconomic variables or vice versa and the results have provided different inferences according to the set of variables, methodologies, and tests employed. Below, we have enunciated some previous research works/papers and their empirical inferences and suggestions.

**Chen, Roll, and Ross (1986)** conducted their study using the economic variables viz. Industrial Production, Inflation, Risk Premia, Term Structure, Market Indices (viz. Equally weighted equities and Value weighted equities), Consumption, and Oil Prices from January 1953 to November 1983 and used Chen's (1983) algorithm to extract the most important stock factors or common co-variations. It was found that an economic variable is significantly related to stock fluctuations if and only if it is significantly related to no less than one of the five common stock factors. Null hypotheses were rejected for production growth, term structure, risk premium, but support for inflation variable was limited. Introducing a market index altered the significance of variables, except for production, which no longer exhibited a significant relationship with the time series of the factors.

**Fama (1990)** investigated the rationality of stock prices by measuring the total return variation explained by shocks to expected cash flows and time-varying expected returns. The explanatory Variables used as a proxy for expected returns and expected-return shocks captured 30 percent of the variance of annual NYSE value-weighted returns and the Growth rates of production that were employed to proxy for shocks to expected cash flows, explained 43 percent of the variance of annual NYSE value-weighted returns.

**Abdullah and Hayworth (1993)** adopted Granger causality tests and Sims' innovation accounting to explain movements in monthly stock returns within a VAR model. The evidence provided the rejection of the view that stock prices are strictly exogenous. The variables such as budget deficits, long-term interest rates, and money growth appeared to be Granger Causal before stock prices. The research findings revealed that stock returns are positively related to inflation but negatively to budget deficits, trade deficits, and both long-term and short-term interest rates and concluded by stating that the employment of daily or weekly data in stock prices restricts the variable set due to the elimination of relevant macroeconomic variables.

**Mukherjee and Naka (1995)** found that the interaction between stock prices and the Tokyo Stock Exchange index forms a co-integrating relationship with six Japanese Macroeconomic variables viz. the exchange rate, money supply, inflation, industrial production, long-term government bond rate, and call money rate. The long-term elasticity coefficients of the selected macroeconomic variables on stock prices are consistent with the hypothesized equilibrium relations. The study employed Johansen's (1991) Vector error correction (VECM) from January 1971 to December 1990 which consisted of 240 monthly observations.

**Naka et al, (1998)** employed a vector error correction model and found that three long-term equilibrium relationships exist among the selected macroeconomic variables and the Indian stock market. Their results depicted that industrial production has a sizeable and positive impact whereas inflation has a sizeable but negative impact on Indian stock prices. It was also stated that Indian stock prices face a downward trend however the same cannot be explained by the variables which are available freely.

**Pethe and Karnik (2000)** analyzed macroeconomic changes in the financial sector since the early nineties using econometric techniques such as unit root testing, co-integration, and error-correction models. Their study revealed that stock markets are demand-driven and policies that have been adopted so far are not depicting any success. So, there does not exist any stable relationship between stock prices and the macroeconomic factors in the long run. Further, the study concluded by stating future research prospects and with relevant suggestions.

**Ahmed (2008)** investigated the causal relationships between stock prices and the key macro variables (viz. IIP, Exports, FDI, Money Supply, Exchange Rate, Interest Rate, NSE Nifty, and BSE SENSEX) representing the real and financial sectors of the Indian Economy. The data was collected from the period of March 1995 to March 2007 quarterly. The study applied Johansen's Co-integration and T-Y Granger Causality test to explore the long-run relationships while Bivariate VAR (BVAR) for variance decomposition and impulse response function to explore the short-run

relationship and concluded that the movement in SENSEX and NIFTY are leading to changes in the exchange rate in the short run however that money supply does not influence the movement in stock market indices while interest rate leads to a change in stock indices, and the stock prices lead to movement in IIP. It also disclosed that the growth rate of the real sector is reckoned with the movement in stock prices.

**Alam et al, (2009)** examined the market efficiency of fifteen developed and developing countries and also looked at the effect of interest rate on share price and changes of interest rate on changes of share price for all countries based on monthly observations from January 1988 to March 2003. Their results showed that for Malaysia, the Interest rate has no relation to the share price which is untrue for Japan as the interest rate has a positive relationship with the share price. The changes in interest rates have a negative relationship with changes in share prices both for Malaysia and Japan. Likewise, all other countries except the Philippines reflected negative relations either interest rates with share price or changes of interest rate with changes of share price or both. The study was based on the basic assumption of the Efficient Market Hypothesis and tools of stationarity of share prices have been tested by using market returns (R).

**Ray and Sarkar (2014)** investigated the dynamic relationship between the Indian stock market and the selected macroeconomic variables for the period January 1991 to April 2004 and applied Co-integration analysis, Granger Causality, and Innovation analysis. The study revealed that the long-run stock market behavior is positively related to output and exchange rate, but negatively related to short and long-term interests, money supply, and inflation. It was suggested that the stock market influences economic activities, particularly industrial activities.

**Singh(2014)** found that there exists a significant impact of explanatory variables(i.e, macroeconomic variables) viz. Index of Industrial Production, Wholesale Price Index, Money supply, Interest Rates, Trade Deficits, Foreign Institutional Investment, Exchange Rate, Crude Oil Price, Gold Price on explained variables(i.e, Indian Stock Market) viz. BSE 100 and CNX 100. The study used monthly frequency of the data that was collected from January 2011 to December 2012 and applied the correlation, multivariate stepwise regression, and Granger causality test. The study concluded that foreign capital is a valuable addition to the market as it has a significantly positive effect on the Indian Stock Market as the money supply. However, Stock Market declines due to a decrease in the value of the rupee concerning the US Dollar. Also, the exchange rate harms the stock market.

**Chittedi(2015)** focused on investigating the nature of the causal relationship between the stock prices and the macroeconomic variables in the BRIC economies. A test of an order of integration for each variable using the Augmented Dickey-Fuller Test(ADF), Phillips-Perron Test(PP), and KPSS tests have been conducted as well as Cointegration and Error-Correction approaches have been used to examine the short-run and long-run relationship between macroeconomic variables and stock prices. It was concluded that there is a long-run and short-run relationship exists between key macro variables and stock prices however the relationship was not consistent for all BRIC countries. Despite the substantial proportion of stock market capitalization as a share of the country's GDP, the majority

of macroeconomic factors could not make leading changes in the BRIC stock markets.

**Robert D. Gay, Jr. (2016)** inquired into the time-series relationship between stock market index prices and the macroeconomic variables, including exchange rate and oil price for BRIC Countries (i.e, Brazil, Russia, India, and China) from March 1999 to June 2006 applying the Box-Jenkins ARIMA Model. The study found that there is no significant relationship between the respective exchange rate and oil price on the stock market index prices of any BRIC country due to the impact of other domestic and international macroeconomic factors on stock market returns. It also suggested that the market of Brazil, Russia, India, and China exhibit the weak-form of market efficiency because there was no significant relationship rooted in present and past stock market returns.

**Kotha and Sahu (2016)** employed monthly data from July 2001 to July 2015 to address long-run and short-run relations between the Indian stock market and selected macroeconomic indicators. The study supported the presence of one cointegrating vector between Sensex and exchange rate, money supply, WPI, and treasury bill rate. It has also been observed that except for exchange rate, all four factors are relatively more significant in a long run. Inflation and money supply have positive and significant relation with stock returns whereas; Interest rate has negative and insignificant relation with stock market returns. While the study reported bi-directional causality between Sensex and Exchange rate in the short run. As a result of the cointegration between stock returns and macroeconomic indicators, the Indian capital market is reflecting signs of inefficiency.

**Giri and Joshi (2017)** investigated the effect of fundamental macroeconomic variables on stock prices in India using annual data from 1979 to 2014. The study used ARDL bound testing and confirmed a long term cointegration relationship between different macroeconomic variables and stock prices in India. The Exchange Rate and Inflation exhibits a positive and significant influence on stock price movements whereas; the Crude Oil Price has a negative and significant influence on stock prices in India. VECM is used in the study which confirmed a short-run unidirectional causality running from foreign direct investment, GDP, and real interest rate to BSE in India.

**Baranidharan and Dhivya (2020)** employed statistical tools such as Descriptive statistics, Correlation, Granger causality test, and VECM. The descriptive statistics revealed that standard deviation values for all selected variables viz. BSE SENSEX, BSE Production Index, FII, Indian Foreign Trade, Money Supply, and WPI were positive and higher than the mean return values. The Correlation and Granger Causal exhibited that macroeconomic variables were not significantly correlated with BSE SENSEX but the changes in BSE SENSEX, Indian Foreign Trade, Money Supply, and Wholesale Price Index caused an impact on the Production Index respectively. Lastly, it was shown in VECM that the lagged value of the BSE SENSEX appeared statistically significant. Their study period was from January 2010 to December 2019.

## RESEARCH GAP

Previously a wide number of empirical studies focused on the effect of the macroeconomic variables on stock prices or vice versa. The review of literature found different BSE

inferences concerning the set of variables, methodologies, and tests employed. However, no study has explained the long-term impact of macroeconomic variables, most particularly the GDP current and constant prices on the Indian Capital Market. Therefore, the present paper broadens the area of analysis by extending the study period from 1995 to 2022 and by investigating the relationship between the SENSEX and NSE NIFTY50 with the GDP at Constant Prices and GDP at Current Prices to exhibit more reliable results.

## OBJECTIVES OF THE STUDY

**1. General Objective:** The main objective is to explore whether the long run movement of BSE SENSEX and NSE NIFTY50 is due to the macroeconomic variables namely the Gross Domestic Product (GDP) at Constant Prices and Gross Domestic Product (GDP) at Current Prices in the context of India.

## 2. Specific Objectives:

- ♦ To investigate the causal relationship between BSE SENSEX and the GDP Current prices.
- ♦ To examine the causal relationship between BSE SENSEX and the GDP Constant prices.
- ♦ To study the causal relationship between NSE NIFTY50 and the GDP Current prices.
- ♦ To evaluate the causal relationship between NSE NIFTY50 and the GDP Constant prices.

## RESEARCH METHODOLOGY

This research is based on secondary data collected yearly from a variety of centralized websites namely RBI ([www.rbi.org.in](http://www.rbi.org.in)), OECD ([www.oecd.org](http://www.oecd.org)), BSE ([www.bseindia.com](http://www.bseindia.com)), NSE ([www.nseindia.com](http://www.nseindia.com)), etc. Since, the Gross Domestic Product (GDP) is one of the most widely used instruments of economic performance, the present work used it as an independent variable to represent the Indian macroeconomic environment whereas BSE SENSEX and NSE NIFTY50 are used as dependent variables to represent the Indian Stock market. The study employed Simple Linear Regression using a well known statistical tool to study the causal relationship between the variables. The time period of this research is 1995-2022.

## LIMITATIONS OF THE STUDY

1. The study underlines the effect of the selected macroeconomic variable (GDP) on the Indian Capital Market Indices. Although GDP is a significant indicator of the growth of the economy, it does not completely represent the Indian macro economy.

2. The secondary data purely served as the basis of the study, therefore, might be subject to less reliability.

3. Due to the question of the reliability of secondary data, the findings and conclusion of this study might not be accurate.

## RESEARCH HYPOTHESES

**H<sub>0</sub>1:** There is no significant impact of GDP Current prices on BSE SENSEX

**H<sub>0</sub>2:** There is no significant impact of GDP Constant prices on BSE SENSEX

**H<sub>0</sub>3:** There is no significant impact of GDP Current prices on NSE NIFTY50

**H<sub>0</sub>4:** There is no significant impact of GDP Constant prices on NSE NIFTY50

**Table 1: DATA SET**

| Years     | BSE SENSEX | NSE NIFTY50 | GDP Constant Prices | GDP Current Prices |
|-----------|------------|-------------|---------------------|--------------------|
| 1994-1995 | 3110.49    | 908.53      | 29558710.70         | 11895012.30        |
| 1995-1996 | 3085.20    | 899.10      | 31790252.10         | 13762098.90        |
| 1996-1997 | 3658.98    | 1079.40     | 33077700.40         | 15246805.00        |
| 1997-1998 | 3055.41    | 884.25      | 35123363.00         | 17486555.40        |
| 1998-1999 | 5005.82    | 1480.45     | 38230278.00         | 19617392.50        |
| 1999-2000 | 3972.12    | 1263.55     | 39698699.60         | 2113407.90         |
| 2000-2001 | 3262.33    | 1059.05     | 41613751.50         | 22843588.80        |
| 2001-2002 | 3377.28    | 1093.50     | 43196728.30         | 24593636.80        |
| 2002-2003 | 5838.96    | 1879.75     | 46592155.90         | 27552793.20        |
| 2003-2004 | 6602.69    | 2080.50     | 50283604.10         | 31438266.30        |
| 2004-2005 | 9397.93    | 2836.55     | 54952372.60         | 35812963.20        |
| 2005-2006 | 13786.91   | 3966.40     | 60043141.00         | 41643863.30        |
| 2006-2007 | 20286.99   | 6138.60     | 65928185.60         | 48357601.20        |
| 2007-2008 | 9647.31    | 2959.15     | 68493423.00         | 54592231.00        |
| 2008-2009 | 17464.81   | 5201.05     | 74301519.10         | 62812622.50        |
| 2009-2010 | 20509.09   | 6134.50     | 81924827.50         | 75479114.50        |
| 2010-2011 | 15454.92   | 4624.30     | 87363287.10         | 87363287.10        |
| 2011-2012 | 19426.71   | 5905.10     | 92130166.60         | 99440131.00        |
| 2012-2013 | 21170.68   | 6304.00     | 98013698.80         | 112335216.10       |
| 2013-2014 | 27499.42   | 8588.25     | 105276736.30        | 124679592.90       |
| 2014-2015 | 26117.54   | 7946.35     | 113694931.40        | 137718738.80       |
| 2015-2016 | 26626.46   | 8185.80     | 123081932.20        | 153916690.10       |
| 2016-2017 | 34056.83   | 10530.70    | 131445821.40        | 170900423.60       |
| 2017-2018 | 36068.33   | 10862.55    | 139929139.40        | 188996684.40       |
| 2018-2019 | 41253.74   | 11877.45    | 145159576.60        | 200748557.90       |
| 2019-2020 | 47751.33   | 13981.75    | 135584734.00        | 198009138.20       |
| 2020-2021 | 58253.82   | 17354.05    | 147692600.00        | 227243000.00       |
| 2021-2022 | 60840.74   | 18105.30    | 157572700.00        | 265637600.00       |

**Source:** OECD, BSE and NSE

## Regression output using SPSS:

| Variable Entered/Removed |                  |                  |        |
|--------------------------|------------------|------------------|--------|
| Model                    | Variable Entered | Variable Removed | Method |
| 1                        | GDP CURRENT      |                  | Enter  |
| 2                        | GDP CONSTANT     |                  | Enter  |

a. Dependent variable: SENSEX and NIFTY b. All requested variables entered.

## Model Summary

| Model | R     | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics |          |     |     |               |
|-------|-------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|
|       |       |          |                   |                            | R Square Change   | F Change | df1 | df2 | Sig. F Change |
| 1     | 0.974 | 0.948    | 0.946             | 3944.54582                 | 0.948             | 473.449  | 1   | 26  | 0.001         |
| 2     | 0.951 | 0.904    | 0.900             | 5366.87420                 | 0.909             | 243.800  | 1   | 26  | 0.001         |
| 3     | 0.975 | 0.951    | 0.949             | 1137.32353                 | 0.951             | 503.320  | 1   | 26  | 0.001         |
| 4     | 0.954 | 0.909    | 0.906             | 1545.44098                 | 0.909             | 260.670  | 1   | 26  | 0.001         |

Predictors: (Constant), GDP Current and GDP Constant

b. Dependent Variable: SENSEX (1,2) NIFTY (3,4)

## COEFFICIENTS

| Model        | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig.  | 95.0% Confidence Interval for B |             |
|--------------|-----------------------------|------------|---------------------------|--------|-------|---------------------------------|-------------|
|              | B                           | Std. Error |                           |        |       | Lower Bound                     | Upper Bound |
| 1/(Constant) | 178.998                     | 1160.115   |                           | 0.154  | 0.879 | -2205.653                       | 2563.648    |
| GDP CURRENT  | 0.000217                    | 0.000      | 0.974                     | 21.759 | 0.001 | 0.000                           | 0.000       |
| 2/(Constant) | -11852                      | 2250.724   |                           | -5.266 | 0.001 | -16478.16                       | -7225.305   |
| GDP CONSTANT | 0.000387                    | 0.000      | 0.951                     | 15.614 | 0.001 | 0.000                           | 0.000       |
| 3/(Constant) | 111.755                     | 334.316    |                           | 0.334  | 0.741 | -575.807                        | 799.316     |
| GDP CURRENT  | 6.46E-05                    | 0.000      | 0.975                     | 22.435 | 0.001 | 0.000                           | 0.000       |
| 4/(Constant) | -3479.6                     | 648.117    |                           | -5.369 | 0.001 | -4811.778                       | -2147.332   |
| GDP CONSTANT | 0.000115                    | 0.000      | 0.954                     | 16.145 | 0.001 | 0.000                           | 0.000       |

Dependent Variable: SENSEX (1,2) NIFTY (3,4)

| ANNOVA       |                |    |             |         |       |
|--------------|----------------|----|-------------|---------|-------|
| Model        | Sum of Squares | df | Mean Square | F       | Sig.  |
| 1 Regression | 7366595083     | 1  | 7366595083  | 473.449 | 0.001 |
| Residual     | 404545485.4    | 26 | 15559441.75 |         |       |
| Total        | 7771140569     | 27 |             |         |       |
| 2 Regression | 7022253762     | 1  | 7022253762  | 243.800 | 0.001 |
| Residual     | 748886806.3    | 26 | 28803338.7  |         |       |
| Total        | 7771140569     | 27 |             |         |       |
| 3 Regression | 651046847.9    | 1  | 651046847.9 | 503.320 | 0.001 |
| Residual     | 33631125.24    | 26 | 1293504.817 |         |       |
| Total        | 684677973.1    | 27 |             |         |       |
| 4 Regression | 622579889.9    | 1  | 622579889.9 | 260.670 | 0.001 |
| Residual     | 62098083.18    | 26 | 2388387.815 |         |       |
| Total        | 684677973.1    | 27 |             |         |       |

Dependent Variables: SENSEX (1,2) and NIFTY (3,4)

Predictors: GDP Current Prices and GDP Constant Prices

In this present study we used the simple regression technique to explain the degree of causal impact of independent variable over the dependent variable for the selected period of study. The dependent variables considered here are BSE SENSEX and NIFTY50.

In the above table, model 1 explains the long run relationship between BSE SENSEX and GDP Current prices. From the regression result obtained using a well known statistical tool, the correlation coefficient is 0.974; we found a very strong degree of positive correlation between the dependent variable (BSE SENSEX) and independent variable (GDP Current prices). The R-squared value explains 94.8% variability on the outcome variable is due to the GDP Current prices. The regression coefficient of GDP Current prices is 0.000217, which is found to be significant at 5% level of significance with  $F(1, 26) = 473.449$  and  $p < 0.05$ . It further entails that due to 0.000217 percent increase in GDP Current prices, the dependent variable i.e. BSE SENSEX will change by one percent. Therefore, the research has sufficient evidence to reject the null hypothesis; indicating a positive and significant impact of GDP Current prices on the BSE SENSEX over the study period.

The obtained model 2 regression output explains the long run causal relationship between the dependent variable namely BSE SENSEX and the explanatory variable namely GDP Constant prices. The correlation coefficient of 0.951; indicated a strong positive correlation among the study variables. Additionally, this study also revealed the rejection of null hypothesis at 5% level of significance with  $F(1, 26)$ ,  $p < 0.05$ , indicating that the BSE SENSEX got impacted by GDP Constant prices. The regression coefficient of 0.000387, shown in coefficient table revealed that, a change by 0.000387 percent in GDP Constant prices the BSE SENSEX will change by one percent. The R-squared value of 0.904 indicated 90.4% variability in BSE SENSEX is due to GDP Constant prices, making this model a good fit.

Model 3 explains the long run relationship between NIFTY50 and GDP Current prices. The correlation coefficient value of 0.975 indicates a very high degree of strong positive relationship between variables. The R squared value of 0.951 explains 95.1% variability in the outcome variable is due to GDP Current prices i.e. the independent variable. The slope coefficient of 0.0000646 indicates that due to 0.0000646 percent change in GDP Current prices, it is the NIFTY50 that changes by one percent, reflecting a high nature in sensitivity due to such causal effect. We found the relationship to be significant at  $F(1, 26) = 503.320$ ,  $p < 0.05$ , indicating the rejection of null hypothesis. Therefore, we conclude that, there is a significant impact of GDP Current prices on NSE NIFTY50.

The Model 4 here captures the long run impact of GDP Constant prices on NSE NIFTY50. The study found a correlation coefficient of 0.954, indicating a strong degree of positive relationship between both the variables. Additionally, the R squared value of 0.909 indicates that 90.9% variability in the dependent variable is due to GDP Constant prices. The B value derived from coefficient table reveals that, for every 0.000115 percent change in GDP Constant prices, it leads to one percent change in NSE NIFTY50. Moreover, the study was found to be significant at 5% level of significance at  $F(1, 26)$ ,  $p < 0.05$ , indicating that NSE Nifty50 got significantly impacted due to GDP Constant prices. We found all the above results consistent

with the study of Muniswamy (2022).

### Variable Analysis: GDP Current prices, GDP Constant prices, BSE SENSEX Closing, NSE NIFTY50.

**Table 2: Durbin Watson test for Autocorrelation**

| Model                               | Durbin Watson Statistic |
|-------------------------------------|-------------------------|
| 1. BSE SENSEX, GDP Current prices   | 2.724313                |
| 2. BSE SENSEX, GDP Constant prices  | 2.680391                |
| 3. NSE NIFTY50, GDP Current prices  | 2.847501                |
| 4. NSE NIFTY50, GDP Constant prices | 2.809312                |

The Durbin Watson statistic for all above models is greater than critical value indicating that our model does not suffer from the problem of autocorrelation.

**Table 3: Jarque-Bera test for normality**

|                   | BSESENSEX  | NSENIFTY50 | GDP Current prices | GDP Constant prices |
|-------------------|------------|------------|--------------------|---------------------|
| Jarque-Bera value | 5.93472384 | 5.1953378  | 3.5674087          | 2.66395375          |
| p-value           | 0.06377788 | 0.07579162 | 0.1680158          | 0.2635491           |

Table 3 shows the Jarque-Bera value used to test normality of sample series. In all the above cases, the p-value is greater than 5% indicating that the data follows normal distribution.

## CONCLUSION

The main objective of this research is to investigate the long run interrelationships between the GDP both at current and constant prices upon the stock indices namely BSE SENSEX and NSE NIFTY50. The study was conducted for a time period covering 1995 to 2022. This research employed both the correlation and regression analysis to report the findings of the study. Findings of this study revealed that in long run, both the GDP Current prices and Constant prices were found to be significant. More interestingly, this study also revealed that, it is the GDP at Current prices that outperformed the GDP at Constant prices, with high positive correlation and high determinant of variance over the period of study. Therefore, we found the impact of GDP at Current prices on BSE SENSEX and NSE NIFTY50 was much as compared to GDP at Constant prices.

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