AN EMPIRICAL ANALYSIS OF NSE NIFTY PERFORMANCE AND TERTIARY SECTOR GROWTH: EVIDENCE FROM INDIA

Abstract

Purpose: This study aims to determine the co-integrating and causal relationship between NSE Nifty and the gross value added (GVA) by the tertiary sector. The impact of NSE Nifty on the gross value added (GVA) by the tertiary sector of the economy has been studied in detail. The stock market is considered the barometer of the economy.

Design/methodology/approach: This study used a vector error correction model to analyze the annual data of the NSE Nifty Index and gross value added by the tertiary sector empirically for the period 2000-2001 to 2020-2021 using software Eviews 11.

Findings: The result of the vector error correction model indicates that when the long-run equilibrium deviates, the GVA by the tertiary sector adjusts to restore stability by rectifying the disequilibrium by 35 percent. Similarly, the Wald Chi-square value and coefficient of error correction term between the NSE Nifty and tertiary sector revealed that NSE Nifty is the leading indicator of the tertiary sector in both the short and long run. The results imply that the tertiary sector will develop when the NSE Nifty rises and that tertiary sector growth will follow in the same manner.

Research limitations/implications: This study suggests that investors may foresee the adjustment in the tertiary sector's movement by focusing on NSE Nifty's movement and making successful investment choices.

Originality/value: The most recent data are used in this study to determine the rate at which variables adapt toward long-run equilibrium.

Keywords: NSE Nifty, tertiary sector, Johansen co integration, India, Vector error correction model

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I. INTRODUCTION

The performance of the stock market is a reflection of the financial and economic situation, and history has demonstrated that stock prices and other financial assets are major drivers of economic activity and contribute significantly to the expansion of the economy. The formation of a sophisticated financial system, specifically a stock market, is an essential determinant in the acceleration of economic growth. As evidenced by history, asset prices and other capital instruments are critical parts of national economies. The stock exchange provides a venue for corporations to raise funds to give shares to investors, and it helps companies build their enterprises. Since share prices on the stock market reflect both investor activity and the nation's financial status, it serves as a leading predictor of economic success. Share prices have an influence on household wealth, consumption, and decisions connected to savings and investment, according to the theories. As a result, the stock market can be regarded as a crucial component of the economy's financial system, as it channels funds and connects savers and investors. The stock market index is used by investors as a benchmark to assess the performance of their portfolios and also serves as a tool for projecting future changes in the stock market. One of the most important pillars of the nation's economy, the securities market has long drawn the attention of the government, businesses, and investors.

The relationship between the stock market and the economy interests financial analysts, investors, economists, policymakers, and practitioners. The idea that the stock market drives economic activity is well-established and piqued the curiosity of investors, stock market regulators, and scholars. According to some economists, the stock market impacts the country's economic development since it provides a platform for enterprises to seek capital for expansion from investors. Well-functioning financial systems encourage technical innovation, and efficient financial institutions enable technological advancements by reallocating resources to entrepreneurs who promote economic progress (Reddy Paramati & Gupta, 2011). The equity market contributes to the country's economic success by enhancing company capital-generating efficiency. The stock market helps businesses to raise money at a lower cost, become less reliant on bank financing, and reduce the risk of a credit crunch. Given that the money market is a significant contributor to capital formation, some academics argue that the stock market has a minor impact on economic growth.

India's tertiary sector accounts for the majority of the country's GDP. It has also piqued foreign investors' attention, boosted exports, and created many jobs. The tertiary sector in India includes hotel, trade, transportation, restaurants, insurance, storage, and communication, financing, personal services, real estate, business services, social and community services, and construction-related services. The tertiary sector in India is essential to the country's economic growth. India's major industry is the services sector. At current prices, the services sector's gross value added (GVA) is predicted to reach 96.54 lakh crore INR in 2020–21. The services sector accounts for a total of 179.15 lakh crore Indian rupees, or 53.89 percent, of India's GVA. India plans to export services worth $350 billion in 2022–2023—a 40% year-over-year increase. India expects to export services worth $350 billion in 2022–2023, up 40% from the previous fiscal year, as important industries like travel, hotel, and entertainment are expected to quickly recover from the pandemic. The Services Business Activity Index/Nikkei/IHS Markit Services Purchasing Managers' Index of India falls to 53 in May 2021, down from 53.6 in April 2021, due to the pandemic's influence on business activity and waning optimism about development prospects. The services industry saw

enormous growth between May 2000 and December 2020, attracting around US$ 85.86 billion in foreign direct investment. When comparing the primary and secondary sectors, data from the Department for Promotion of Industry and Internal Trade (DPIIT) shows that the service industry comes out on top. The Ministry of Education (MoE) and the University Grants Commission (UGC) launched an online investor outreach initiative in April 2021 to streamline processes and lessen the problem of compliance in the higher education business. The government is focusing on the services sector, and as a result, several incentives have been granted to a number of businesses, including banking, transportation, education, engineering, information technology, communications, tourism, health care, finance, and management. In addition, the responsible authorities are currently pursuing a number of initiatives, including allocating Rs. 7,000 crores to the Bharat Net program in the Union Budget 2021-22 in order to improve digital connectivity across the country, as well as raise the foreign direct investment limit for insurance companies from 48% to 73%. The healthcare industry in India is anticipated to be worth US$ 132 billion by 2023, the digital economy will be worth US$ 1 trillion by 2025, and the IT and business services sector will be worth US$ 14.3 billion. The GST (Products and Services Tax) enacted by the Indian government has created a common national market, cutting the overall tax burden on goods and services. The tertiary sector in India is the country's largest industry. Out of the three, the tertiary sector is the most important contributor to national revenue growth.
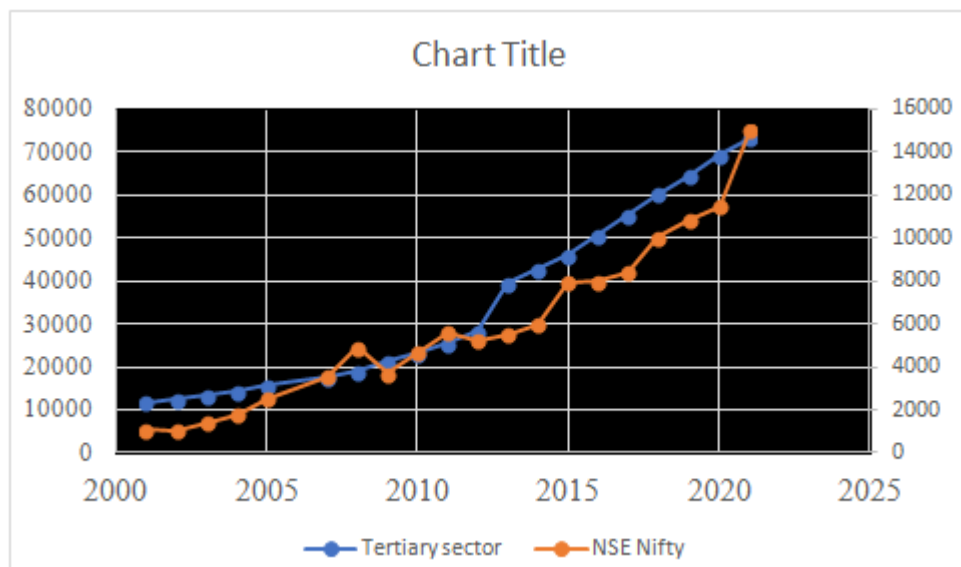
Source: www.1.nseindia.com and the Reserve Bank of India publications -Handbook of Statistics on Indian Economy (2014-15 to 2020-21).

Figure1: Yearly Data of NSE Nifty and GVA by the Tertiary Sector

The yearly data of the NSE Nifty and gross value added by the tertiary sector are shown in Figure 1. This graph demonstrates that the NSE Nifty and the tertiary sector are increasing.

1. **Need for the Study:** Stock markets are an essential factor in the country's economic development. Because the equities market is the source of liquidity in economic flows, the country's success relies heavily on it. The financial sector's growth increases

consumer wealth, leading to higher spending and economic health. The economy will probably follow the trend if a country's stock market is performing well and is anticipated to rise quickly(Jin & Guo, 2021). India's stock market has increased regarding the number of stock exchanges and investor population. The reform process has resulted in an almost unprecedented growth rate in any country's history. The market's shape and structure have changed dramatically in recent years. Investors are excited by emerging economies, such as India's stock market. Since the government began implementing measures for liberalization and globalization in 1991, the Indian stock market has seen significant upheaval. The stock market is growing in importance from a macroeconomic perspective. As one of India's main sources of funding, the stock market has developed into an essential component of the modern market-based economy, enabling both financial growth and economic advancement. In truth, the Indian stock market is one of **the** world's fastest-growing marketplaces. The smoother development of the Indian stock markets continues to be breathtaking. The NSE Nifty rose from 1,263.55 points on March 31, 2000, to 5,290 points in January 2008. The NSE Nifty is hanging around 17,250 points, an all-time high in September 2021. Based on diverse techniques, some researchers have come to contradicting results about the interplay of share market returns and the economy.

The impact of the financial market on economic growth affects the savings rate, as a straightforward process, along with the savings percentage destined for investments, by affecting the marginal productivity of assets, which can produce a social and behavioral change. (Cristescu et al., 2021). To begin with, speculative behaviors increase market volatility and make the market more unpredictable. Second, a lack of transparency is widely accepted as a critical issue for investors. Corporate reporting standards fall far short of those found in established stock markets in terms of definition and thoroughness. Third, public information lacks transparency and clarity, rendering it unreliable. As a result of all of these concerns, investors may become irrational and make decisions based on market consensus. As a result, policymakers, investors, and researchers must evaluate the impact of the equity market on the economy's performance.

2. **Purpose of the study:** This study examines if the NSE Nifty impacts the tertiary sector's health. It would be one of the few studies on the NSE Nifty and its impact on India's tertiary sector growth. It will provide investors and policymakers with a better knowledge of market emotions and a clear understanding of tracking developments in the tertiary sector, as indicated by the movements in the NSE Nifty.

3. **Organization of the study:** The study's first section focuses on comprehending the stock market and economy, specifically the NSE Nifty and the tertiary sector, by looking at the website and market data and reviewing existing literature on the stock market and economy. In addition, the second portion focuses on the many topics that have been researched so far, as well as the theoretical framework that has been addressed in past research investigations. The research technique econometric model defined and data collected for this study are described in the third section. The fourth section discusses the findings and the results. Finally, the conclusion is presented, followed by practical implications. The paper also mentions the study's limitations and suggestions for future research.

II. REVIEW OF LITERATURE

Starting with Goldsmith's work in 1969 and Shaw's work in 1973, the relationship between financial liberalization, stock market development, and economic growth has been passionately questioned in the theoretical literature. Based on two critical methodologies, their viewpoints showed financial development's positive contribution to higher economic growth rates. The "supply leading" role and the "demanding following" role amplify the positive influence of capital on economic and financial development. The deregulation of capital accounts and the development of the financial industry have had a significant impact on the growth of the economy. Under the factors that drive stock market development and growth indicators, relationship. (Levine, 1996), conducted research on stock market indicators and found a causal relationship between stock market development and economic growth. Stock market growth promotes investors' access to financial resources and encourages efficient resource allocation, enabling domestic and international investments. The stock market's proper operation is a critical condition for the financial sector's evolution, which is essential for long-term economic growth and the transformation of the national economy into one appealing to international investors. According to (Pushpalatha,2019), the Nifty and Nifty fifty Selected Companies in the Financial Service Sector are relatively inefficient and follow a random walk. (Gulabrao Jadhav, 2012) concluded that a multivariate regression model is helpful for accurately anticipating stock prices. In predicting stock prices daily, daily and intraday prices are preferable over monthly/quarterly or annual prices. It can be inferred from the preceding sector-by-sector data analysis of all the firms' characteristics that Earnings per Share, Dividend per Share, Price-Earnings Ratio, Dividend Yield, and Book Value per Share all play a significant influence in influencing the price of equity shares in the market.

(Carp, 2012) make an effort to establish a link between Romania's stock market expansion and economic expansion. The findings revealed that real investments, which indirectly generate positive externalities on stock market indicators and in the real sector, encourage a more significant economic growth rate. When market capitalization and stock value are exchanged, economic growth rates are unaffected, according to Granger Causality study, underscoring the stock market's underdeveloped state and minimal impact on the Romanian economy. (Sawarni,2022) investigates how effective working capital management affects businesses' financial performance and how business expansion affects this relationship. According to this analysis, AMG enterprises manage their working capital more effectively than BMG firms. Additionally, it states that WCM efficiency has a favorable impact on a company's profitability and valuation; however, this association is more robust for companies with rapid growth than those with slower growth. (Ranjan Dash, 2012) examines the price ramifications of the overall market-wide investor sentiment risk for cross-sectional return variance in the presence of other market-wide risk components. In a multifactor model approach, the author argues for the sentiment risk's global price implications. (Laopodis, 2016) looked at how a country's total stock market relates to its overall economic development and came to the conclusion that the stock market cannot support the growth of these economies unless it is a part of an all-encompassing financial system (which includes banks) and investment in actual capital.

(Levine, R., & Zervos, S., 1996) indicated conflicting perspectives, researchers and economists have paid more attention to the relationship between financial development and

economic growth. Some have shown a favorable association between the variables, while others have substantial doubts. Significant research on the subject attempted to establish the presence of any link between financial development and economic growth, as well as the nature and direction of causality, i.e., whether financial development supports economic growth or the relationship is the other way around. (Rakshit,2022) investigate how changes in exchange rates, oil prices, and COVID-19 cases affect stock market returns and volatility for a few selected emerging market economies. The results show that during the coronavirus pandemic, exchange rate volatility has a negative and significant impact on market returns in Brazil (BOVESPA), Chile (S&P CLX IPSA), India (SENSEX), Mexico (S&P BMV IPC), and Russia (MOEX). (Ngong, 2022) examines the relationship between the growth of the stock market and agricultural production in emerging African economies. The results show a bidirectional causal relationship between labor and agricultural value added and a unidirectional causal relationship between agricultural value added and market capitalization and stock value traded. (Bonga,2022) examines the relationship between the growth of the stock market and agricultural production in emerging African economies and the results show a bidirectional causal relationship between labor and agricultural value added and a unidirectional causal relationship between agricultural value added and market capitalization and stock value traded. (Kumeka,2022) examined the major stock markets in 12 African economies during the most recent worldwide pandemic demonstrating that these economies' stock market returns were unaffected significantly by the rise of COVID-19 cases and deaths.

(**Reddy Paramati & Gupta, 2011**) experimentally investigated the relationship between stock market performance and economic growth in the context of India. The Granger causality test results show that IIP and stock prices (BSE and NSE) have a bidirectional relationship. The short-run and long-run dynamics of the observable variables were also explored. This shows that causality exists in both directions. The quarterly findings of the Granger causality test show no causal relationship between BSE and GDP. The study used the Engle-Granger cointegration test to evaluate the long-run connection between the observable variables. The model was estimated to explore how the short-run disequilibrium is rectified. According to the error correction model, once the IIP and BSE (or NSE) part ways, in the long run, the IIP corrects 4% (or 5%) of the disequilibrium in order to make the necessary changes to restore the long-term balance. (Kumar & Mishra,2020) investigate long-term similarity in liquidity using a variety of proxies calculated from sparse NIFTY50 stock order book data, and the results show that the NIFTY50 market and its encompassing industries have regular liquidity or commonality.

(**Lee et al., 2013**) concluded that stock market development measures such as market capitalization and turnover ratio benefit India's economic growth. The current study, therefore, recommends that capital market regulators put into place efficient policy frameworks to encourage the growth of the Indian stock market in order to significantly increase the size, depth, and liquidity of the Indian stock market, which will result in increased economic activity. The government should prioritize the development of the stock market by relaxing laws and listing requirements for investors to attract more market participants to the stock exchange, increasing competition and the quality of securities investments, thus significantly impacting India's economic growth. (Srinivasan, 2014)

(**Singh & Padmakumari, 2017**) disprove the assertion that Indian markets reflect the information content of inflation announcements and that no anomalous return exists after

examining the influence of inflation announcements on the stock market from 2012 to 2018, with a focus on five different industries. The market reaction, however, differs depending on the sector and inflation regime. As India transitioned from WPI to CPI and IT, the inflation effect seemed to fade away. One factor is that the regime's long experience has led to a better understanding of RBI monetary policy decisions. Investigate the link between stock market expansion and economic expansion (Sajid Nazir, 2010). The rise of stock markets is essential for sustaining faster economic growth. The liquidity of the stock market has less of an effect on economic growth than does market size, as determined by market capitalization. Additionally, there is a strong correlation between the development of human capital and Pakistan's economic growth. The recent study offers some implications for Pakistan's financial experts and banking authorities as a result.

(**Hossain et al., 2013**) revealed that stock market crises can be avoided in the long run when interest rates are controlled. The efficient market hypothesis is supported by a co-integrating relationship between macroeconomic factors and stock prices.

(**Saganga, 2020**), argues that short- and long-term positive and negative causal relationships exist between stock market development and economic growth. On the other hand, the economic expansion only has a detrimental long- and short-term impact on liquidity.

(**Pramod, 2015**) discovered that the stock market's expansion has a significant impact on economic expansion. Additionally, a unidirectional causality has been discovered linking stock market expansion to economic expansion, and this result supports the supply-leading concept. Additionally, it is obvious that macroeconomic elements with a significant impact on economic growth and stock market development include investment ratio, trade openness, and currency rates.

(**Tarak Nath Sahu et al., 2014**) evaluated the dynamic relationships between oil price shocks and the Indian stock market, and the findings point to the presence of a dedicated partnership. Additionally, the VECM's error correction term demonstrates that the oil price moves causally from the Indian stock market in the long run, but not the other way around. The Granger causality test conducted inside the VECM framework yielded no evidence of short-run causation between the variables. The Indian stock markets and crude oil prices are substantially exogenous, according to the VDCs analysis and the study of the IRFs showed that a rise in oil prices has a short-term, somewhat positive influence on Indian stock markets that persists and improves. To throw some light on the macroeconomic factors that must have a significant impact on the development of stock markets, (ben Naceur *et al*., 2007) explore the role of stock markets in economic growth. It is discovered that the critical factors of stock market development are the saving rate, financial intermediary, stock market liquidity, and the stabilizing variable. Furthermore, it is discovered that stock markets and financial intermediaries work better together than separately to promote growth. Using time-series data from 2012 to 2018, Singh & Padmakumari (2017) analyze the response of stock returns to the inflation announcement and the results show significant abnormal returns, which depend on the industry and the regime. Some industries and regimes are more susceptible to inflation announcements than others. (Su & Yi, 2022) suggested a hidden Markov model (HMM)-based stock price prediction approach, and evaluations on six months of HSI demonstrate that the predicted value of the proposed model is very near to the actual value and beats three benchmarks in terms of RMSE, MAE, and R.

(Ahmad & Aqib, 2021) noted that employment rises as the service industry develops and that it has developed significantly faster than other industries. Its growth rate is discovered to be faster than the expansion of global GDP. (Basha et al.2014) concluded that the majority of economies rely heavily on the service industry, which boosts national economies. The economy's growth rate should expand beyond the service sector to include the agricultural and industrial sectors. (Das et.al.,2014) examine how quarterly earnings reports affect stock price changes for the companies that make up the SENSEX under two distinct market conditions: a booming market followed by a recessionary one. According to the study, quarterly earnings reports had no statistically meaningful impact on stock returns during either bullish or bearish market situations. (Verma and Bansal,2021) identifies many macroeconomic factors that impact both developed and emerging economies stock market performance. The authors found that gross domestic product (GDP), foreign direct investment (FDI), and foreign institutional investment (FII) have beneficial effects on stock markets in emerging and developed countries, but have negative effects on gold prices. Except for a few developing nations, interest rates had a negative effect on both economies. For countries that export oil, the link with oil prices was favorable; however, it was negative for countries that import oil. The macroeconomic factors that affect sectoral indices in the same way they affect broad market indices include GDP, money supply, and inflation.

1. **Research methodology:** The literature review reveals that there are still many questions to be answered, such as how the NSE Nifty influences the tertiary sector, particularly in emerging nations like India. To what extent can the NSE Nifty explain the tertiary sector's changes? Is there a causal relationship between the NSE Nifty and the tertiary sector?

2. **Objectives of the study:** This study examines the relationship between NSE Nifty growth and tertiary sector growth in the current Indian economy. So, the following are the research objectives:
   - To examine the long-run relationship between NSE Nifty and Gross value added by the tertiary sector.
   - To analyze the impact of NSE Nifty on Gross value added by the tertiary sector.
   - To investigate the cause-and-effect relationship between NSE Nifty and Gross value-added by the tertiary sector.

3. **Hypothesis:** The research hypotheses in this study have been formulated based on the research objectives.

   Hypothesis Development

   - **Long-run relationship:** If short-run shocks affect movement in any variable, the presence of a long-run connection indicates that they will converge with time in the long run. Using cointegration analyses for the period of June 1991 to June 2013, the study demonstrates a clearly defined long-run equilibrium relationship between stock market development indices and economic growth in India(Dr. Srinivasan P,2014). The hypothesis is formulated based on the preceding arguments.

H_{01}: **There is no long-run relationship between NSE Nifty and GVA by the Tertiary sector**

- **Error correction term:** It shows how rapidly the present period corrects the previous period's departure from long-run equilibrium. When the long-run equilibrium deviates, the error correction model reveals that economic growth adjusts to restore equilibrium by rectifying the disequilibrium, providing evidence in favor of the 'demand following' hypothesis in the short run (Lenuta Carp,2012). The hypothesis is formed after the review.

H_{02}: **There is no impact of NSE Nifty on GVA by the Tertiary sector**

- **Cause & effect relationship:** The cause-and-effect relationship determines which variable a predictor is of the other. The IIP and stock prices have a bidirectional relationship (BSE and NSE). This demonstrates that there is a two-way causal relationship between stock market performance (stock prices) and economic growth (IIP), as well as vice versa. The findings of the Granger causality test indicate that there is no causal connection between BSE and GDP, but there is a one-way relationship between NSE and GDP that flows from GDP to NSE (S. Paramati & Rakesh Gupta, 2011). The idea is supported by earlier findings.

H_{03}: **There is no cause-and-effect relationship between NSE Nifty and GVA by the Tertiary sector**

4. **Data collection:** This study relies on secondary data. The National Stock Exchange's official website (www.1.nseindia.com) and the Reserve Bank of India's Handbook of Statistics on the Indian Economy (2014-15 and 2020-21) were used to compile the data.

Data Analysis Tools and Techniques

- **Independent variable:** The independent variable for this study is NSE Nifty. The National Stock Exchange uses the NSE Nifty as a point of reference. It consists of 50 enterprises based on free-float market capitalization. It is seen as a measure of company health and, eventually, the economy. The NSE Nifty is used as a benchmark for portfolios.

- **Dependent variable:** The dependent variable for this study is the Gross value added (GVA) by the tertiary sector. The tertiary sector includes administration, financial and real estate activities, transportation, commercial and personal services, health, education, and social work. Sector development aids the growth of the elementary and secondary sectors, and it is beneficial to the manufacturing process. The gross value added by the tertiary sector is the input of the tertiary sector to the country's Gross Domestic Product.

- **Unit root test:** The investigation begins with the unit root test, which establishes the integration sequence using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests.

- **Johansen co-integration test:** The Johansen co-integration test determines whether two-time series are co-integrated. Several co-integrating relationships are possible with this test. In a nutshell, it's used to figure out how to calculate a relationship (Wee & Tani, 1997). Johansen co-integration test provide us to determine the number of co-integration connections and the parameters of this relationship (Toraman & Başarir, 2014).The co-integration test can be done if the variables are integrated to order one. Whether the variables have a long-run relationship arises if the series has a unit root. Whether a long-run equilibrium relationship among variables exists occurs when a unit root for a data series is established. As a result, the Johansen technique looks for co-integrated vectors in non-stationary time series using the highest likelihood process.

- **Vector Error Correction Model (VECM):** A vector error correction model is a constrained VAR that can be used on nonstationary data that has been cointegrated. The cointegration component is the error correction term because the departure from long-run stability is gradually addressed by a series of partial short-run corrections. The vector autoregressive model, which is made up of many time series, is a useful tool for forecasting.

- **Wald Test:** The Wald test, also known as the Wald Chi-Squared test, is used to measure the significance of explanatory variables in a model. A substantial explanatory variable adds to the model if it is present.

- **Results and discussions:** A range of empirical analytic techniques and approaches were used to investigate the data's characteristics.

- **Unit root test:** To account for the problem of spurious regressions, this study uses a time-series analysis, therefore each variable series will be tested for stable qualities using the Augmented Dicky-Fuller test and the Phillips-Perron test.

- **Augmented Dicky-Fuller test:** The test results of the ADF test are as follows: -

Table 1: Augmented Dickey-Fuller (ADF) Test

	At Level		At first differencing		Order
	t- Statistics	Prob.	t- Statistics	Prob.	
NSE Nifty	1.39	0.99	-4.23*	0.00	I (1)
Tertiary Sector	2.30	0.99	-3.13*	0.04	I (1)
1% Critical Value	-3.831511		-3.857386		
5% Critical Value	-3.029970		-3.040391		
10% Critical Value	-2.655194		-2.660551		

Source: Author's own computation

H_0: Series is not stationary. * Indicates rejection of H_0 at a 5% significance level

Table 2: Phillips-Perron test

The test results of the Phillips- Perron test are as follows:

	At Level		At first differencing		Order
	t- Statistics	Prob.	t- Statistics	Prob.	
NSE Nifty	3.5562	1.00	-5.600*	0.00	I (1)
Tertiary Sector	2.3035	0.99	-3.134*	0.04	I (1)
1% Critical Value	-3.831511		-3.857386		
5% Critical Value	-3.029970		-3.040391		
10% Critical Value	-2.655194		-2.660551		

Source: Author's own computation

H_0: Series is not stationary. * Indicates rejection of H_0 at a 5% significance level
ADF test & PP test results confirm that the data are not stationary at level but become stationary at the first difference level.

This research uses annual data from two different base years, namely (2004-2005) and (2011-2012), So, dummy variables are used as exogenous variables to circumvent the problem of a structural breach in the dataset.

- **Lag length:** The purpose of choosing the appropriate lag is to minimize residual correlation. A lag is a preset amount of time that passes between two occurrences. The lag length for the variables is as follows: -

Nse Nifty:

Table 3: NSE NIFTY

Lag	Akaike information criterion	Schwarz information criterion
0	19.02646	19.07592
1	16.17735*	16.27628*
2	16.22815	16.37655

Source: Author's own computation

Tertiary Sector:

Table 4:Tertiary Sector

Lag	Akaike information criterion	Schwarz information criterion
0	22.75308	22.80255
1	18.36421*	18.46314*
2	18.47533	18.62372

Source: Author's own computation

Interpretation: The optimal lag length for the variables is one.

- **Johansen co-integration test:** To see if these variables are co-integrated, the Johansen co-integration test is applied. The test result of Johansen co-integration is as follows: -

NSE Nifty and GVA by Tertiary Sector

H_{01}: There is no long-run relationship between NSE Nifty and GVA by the Tertiary sector

Table 5. Johansen co-integration test (NSE Nifty and GVA by the Tertiary sector)

Hypothesized No. of CE	Trace Statistics	0.05 Critical Value	Prob.	Normalized cointegrating equation
None	35.20*	14.26	0.000	Tertiary sector = Tertiary sector – 4.884305 NSE Nifty
At most 1	0.199	3.841	0.655	

Source: Author's own computation. * Indicates rejection of H_0 at a 5% significance level

Interpretation: The null hypothesis is rejected because the value of the test statistics is greater than the critical value and one cointegrating equation is present between the variables at a 5% level of significance.

- **Vector Error Correction Model (VECM):** VECM is used to frame the model for the study. The models developed for the study are as follows:-

NSE Nifty and GVA by Tertiary Sector

H_{02}: There is no impact of NSE Nifty on GVA by the Tertiary sector

The model and the speed of adjustment should be assessed among the variables by estimating the VECM.

Table 6: Estimated Long Run and Short Run Coefficients using VECM approach (NSE Nifty & GVA by the Tertiary Sector)

GVA by Tertiary sector	Coefficient	Probability
C (1)	-0.356316	0.0000
C (2)	-0.476983	0.0000
C (3)	-0.346817	0.0030
C (4)	-1.059779	0.0023
C (5)	-0.510002	0.0604
C (6)	2186.985	0.0002
C (7)	9214.840	0.0000
R-Squared (0.959251)		
F – statistics (39.23377)		
Prob (F-statistics) (0.0000)		

Source: Author's own computation**.**

The following is the model produced using the vector error correction model:

$$\triangle \text{Tertiary sector}_t = -0.35 \triangle \text{Tertiary sector}_{t-1} - 5.201618 \triangle \text{NSE Nifty}_{t-1} - 7924.0349 - 0.47 \triangle \text{Tertiary sector}_{t-1} - 0.34 \triangle \text{Tertiary sector}_{t-2} - 1.05 \triangle \text{NSE Nifty}_{t-1} - 0.51 \triangle \text{NSE Nifty}_{t-2} + 2186.985 + 9214.840 \, dv$$

Interpretation: The model reveals that the NSE Nifty has a considerable and beneficial impact on the tertiary sector's Gross Value Added simultaneously in the short and long term. The ECM coefficient is used to evaluate both short and long adaptation processes at the same time. The equilibrium is sensitive to external downturns, the coefficient ranges from zero to minus one, and the equilibrium path converges to the long-run equilibrium path. It suggests that divergence from the current period's balance level of the tertiary sector's Gross Value Added will be rectified by 35% in the following period to restore equilibrium.

- **Validity of the model:** A model must pass the residual and stability diagnostics in order to be accepted.

Table 7: Breuch-Pagan-Godfrey Heteroscedasticity test (NSE Nifty & GVA by the Tertiary Sector)

F- Statistic	0.328357
Prob.F(7,9)	0.9220
Obs* R-Squared	3.458374
Prob.Chi-Square (7)	0.8396
Scaled explained SS	0.840485
Prob.Chi-Square (7)	0.9970

Source: Author's own computation

Interpretation: The model is not affected by heteroscedasticity.

Table 8: Breuch LM Serial Correlation Test (NSE Nifty & GVA by the Tertiary Sector)

| F-Statistic	1.409671
Prob.F(2,8)	0.2989
Obs* R-Squared	4.429920
Prob.Chi-Square (2)	0.1092

Source: Author's own computation

Interpretation: The model has no serial correlation.

Table 9: Jarque-Bera Normality test (NSE Nifty & GVA by the Tertiary Sector)

|	
Mean	-5.32e-13
Median	-11.07070
Maximum	729.9490
Minimum	-932.0990
Standard Deviation	488.4712
Skewness	-0.519934
Kurtosis	2.404708
Jarque-Bera	1.016954
Probability	0.601411

Source: Author's own computation
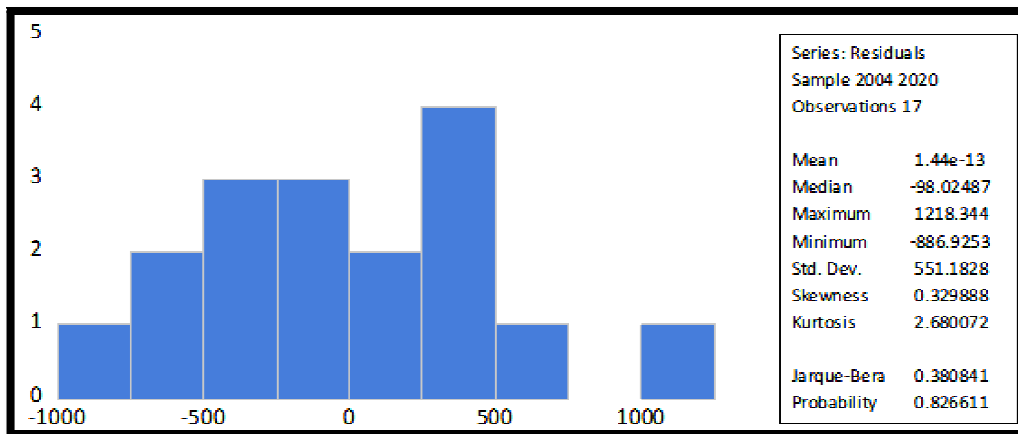
Source: Author's own computation

Figure 2: Jarque-Bera Normality test (NSE Nifty & GVA by the Tertiary Sector)

Interpretation: The model's residuals are regularly distributed.
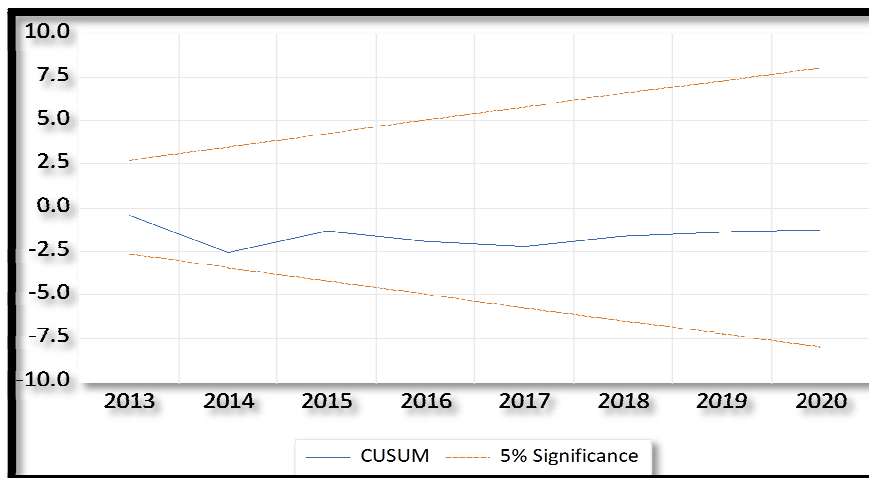
Source: The author's own computation

Figure 3: Cusum test (NSE Nifty & GVA by the Tertiary Sector)

Interpretation: In this study, the cumulative sum (CUSUM) and the cumulative sum of square (CUSUMSQ) tests were used to assess the stability of longer and shorter-run parameters which confirms that the models appear to be stable and well-specified.

- **Wald test:** NSE Nifty and GVA by Tertiary Sector

H_{03}: There is no cause-and-effect relationship between NSE Nifty and the Tertiary sector.

Table 10: Coefficient of ECT & Probability (NSE Nifty & GVA by the Tertiary Sector)

Coefficient of Error correction term	Probility
- 0.35*	0.00

Source: The Author's own computation. * Indicates rejection of H_0 at a 5% significance level

Table 11: Wald Chi-Square test (NSE Nifty & GVA by the Tertiary Sector)

Chi-Square	Prob.
16.87	0.00

Source: The author's own computation. * Indicates rejection of H_0 at 5% significance level

Interpretation: ECT is substantial statistically for specification with GVA by the tertiary sector and at a 5% level of significance, the Chi-square value between NSE Nifty and GVA by the tertiary sector is statistically significant which demonstrates that the NSE Nifty granger causes GVA by the tertiary sector in both the short and long-term. So, as a result, H_0 is ruled out.

To summarize, both explanatory and reliant variables have a long-term link, the predictor value can foretell the reliant variable, and the financial crisis affects the stock market & economy.

III. CONCLUSION

In this study, the association between NSE Nifty performance and tertiary sector growth was studied. This study examined the causal relationship as well as the short- and long-run dynamics between the variables for the Indian setting. The empirical analysis was carried out on an annual basis between 2000–2001 and 2020–2021. The observed variables were found to be of order one, or I, according to the findings of the ADF and PP tests (1). This suggests that the variables in the study are non-stationary (unit root) at their levels and stationary at their first difference, demonstrating that the study is able to predict the variables' short- and long-run dynamic behavior. The results of the Johansen cointegration test indicate that there is a cointegrating relationship between the variables, indicating that there is a long-run relationship between NSE Nifty and GVA by the tertiary sector, implying that if there are short-term shocks that affect movement in any variable, they will converge with time in the long run. When the long-run equilibrium deviates, the GVA of the tertiary sector adjusts to restore stability by rectifying the disequilibrium by 35 percent. Similarly, the Wald Chi-

square value and Coefficient of the Error correction term between the NSE Nifty and Tertiary sector reveal that the NSE Nifty granger causes the Tertiary sector in both the short and long run.

The results of this study lend both immediate and long-term support to the supply-following theory in the context of India. The study's conclusions imply that the GVA produced by tertiary sector movements has been strongly influenced by NSE Nifty expansion. By establishing sound investment strategies, NSE Nifty growth is more likely to stimulate and foster the development of the tertiary sector.

1. **Policy implications of the study:** The current study provides implications for investors, legislators, and the government. For the investors, the study suggests that investors may foresee a tertiary sector's movement by keeping an eye on NSE Nifty's movement and making successful investment choices. For the government and the RBI, this study provides the foundation to formulate fiscal and monetary strategies for the country's tertiary sector growth. The study offers guidance to regulators, namely SEBI, for developing recommendations and changes to legislation for future investment policy. The study also contends that risk-averse investors can make sound investment choices based on the tertiary sector's speed of adjustment towards long-term equilibrium.

2. **Limitations and future scope of the study:** Only the tertiary sector was used as a dependent variable in this study; however, the primary and secondary sectors can also be examined. In this study, only the NSE Nifty is used as an independent variable; however, the BSE Sensex can also be used. The current research might be expanded to include a cross-country examination, and future research could look into the impact of the COVID-19 pandemic on the association between the NSE Nifty and the tertiary sector.

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