**An Empirical Analysis of NSE Nifty Performance and Tertiary Sector Growth: Evidence from India**

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**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 as 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 findings imply that tertiary sector growth moves in the same direction as the NSE Nifty and that the NSE Nifty increase will lead to the development of the tertiary sector.

**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 –**This study determines the speed of adjustments between variables towards long-run equilibrium using the most recent data.

**Keywords:** NSE Nifty, tertiary sector, Johansen cointegration, India, Vector error correction model

**PAPER TYPE:** Research Paper

**JEL CLASSIFICATION:** E44, F63, O14

**Introduction**

The stock market's performance reflects the financial and economic condition, and experience has shown that stock prices and other financial assets are important parts of economic activity and play a crucial role in the economy's growth. 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. The stock exchange is a leading indicator of economic success, with share prices reflecting the country's financial situation and investor activity. 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. Investors use the stock market index as a benchmark to compare the performance of their portfolios, and it also assists investors in forecasting future stock market fluctuations. The government, corporations, and investors used to keep an eye on the securities market because it is one of the most crucial foundations of the country's economy.

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.

Figure1. Yearly data of NSE Nifty and GVA by the tertiary sector

Source: www.1.nseindia.com and the Reserve Bank of India publications -Handbook of Statistics on Indian Economy (2014-15 to 2020-21).

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.

**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. If a country's stock market is functioning well and is expected to rise quickly, the economy will likely follow the trend (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. Rising economies, such as India's stock market, excite investors. The Indian stock market has changed considerably since 1991 when the government launched liberalization and globalization policies. From a macroeconomic standpoint, the stock market is becoming increasingly significant. The stock market has evolved into a critical driver of the modern market-based economy, functioning as one of India's key sources of money, allowing for financial expansion and economic progress. 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 rules are inadequately defined and significantly less thorough than those found in established stock markets. Third, public information is neither transparent nor clear, making it untrustworthy. 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.

**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.

**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.

**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) attempt to establish a correlation between stock market development and economic growth in Romania. 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. Granger Causality analysis revealed that the exchange of market capitalization and stock value does not affect economic growth rates, highlighting the stock market's low degree of development and limited involvement in 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) analyses in the presence of other market-wide risk factors, the pricing implications of the entire market-wide investor sentiment risk for cross-sectional return variance. The author makes a case for the universal price implications of sentiment risk in a multifactor model approach. (Laopodis,2016) examined the relationship between a country's aggregate stock market and general economic development and concluded that the stock market cannot help these countries' economies flourish unless it is a component of a comprehensive financial system (which includes banks) and an 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 demonstrate that these economies' stock market returns were unaffected significantly by the rise of COVID-19 cases and deaths.

(Reddy Paramati & Gupta, 2011) explored the causal link between stock market performance and economic growth empirically for the Indian context. The short-run and long-run dynamics of the observable variables were also investigated and the results of the Granger causality test demonstrate that IIP and stock prices (BSE and NSE) have a bidirectional link. 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. The error correction model reveals that When the IIP and BSE (or NSE) depart in the long run, IIP then makes the necessary adjustments to restore long-run balance by correcting 4% (or 5%) of disequilibrium. (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. As a result, the current study suggests that capital market regulators implement effective policy frameworks to promote the development of the Indian stock market to significantly increase the size, depth, and liquidity of the Indian stock market, which will lead to 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) examined the impact of inflation announcements on the stock market from 2012 to 2018, focusing on five different sectors, and the evidence was discovered to refute the claim that Indian markets reflect the inflation announcement's information content and that no abnormal return exists. 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. (Sajid Nazir, 2010) look into the relationship between stock market development and economic growth. The development of stock markets is critical to sustaining a higher level of economic growth. However, the market size, as measured by market capitalization, has a greater impact on economic growth than the stock market's liquidity.

Furthermore, foreign direct investment (FDI) and human capital development have a robust association with Pakistan's economic growth. As a result, the current study has some ramifications for Pakistan's banking regulators and financial specialists. (Hossain et al., 2013) revealed that stock market crises can be avoided in the long run when interest rates are controlled. A co-integrating link between macroeconomic variables and stock prices supports the efficient market hypothesis.

(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. It is also evident that macroeconomic factors, such as investment ratio, trade openness, and currency rates considerably impact economic growth and stock market development.

The dynamic links between oil price shocks and the Indian stock market are examined by (Tarak Nath Sahu *et al*., 2014) and the outcome suggests the existence of a committed 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. According to the findings of the Granger causality test performed within the VECM framework, there is no 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 discovered that the stock markets of emerging and developed nations are positively impacted by gross domestic product (GDP), foreign direct investment (FDI), and foreign institutional investment (FII) but negatively impacted by the price of gold. 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.

**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?

**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

**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. The study reveals a well-defined long-run equilibrium relationship between stock market development indices and economic growth in India using cointegration tests for June 1991 to June 2013. (Dr. Srinivasan P,2014). The hypothesis is formulated based on the preceding arguments.

***H01*: There is no long-run relationship between NSE Nifty and GVA by the Tertiary sector**

**Error correction term:** It depicts how quickly the preceding period's divergence from long-run equilibrium is corrected in the current period. 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.

***H02*: 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 shows that causality exists in both directions, from stock market performance (stock prices) to economic growth (IIP) and vice versa. The Granger causality test results show no causal relationship between BSE and GDP; however, there is a unidirectional relationship between NSE and GDP that runs from GDP to NSE (S. Paramati & Rakesh Gupta,2011). The notion is based on previous observations.

***H03*: There is no cause-and-effect relationship between NSE Nifty and GVA by the Tertiary sector**

**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 i.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

H0: Series is not stationary**.** \* Indicates rejection of H0 at a 5% significance level

Table ii. 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

H0: Series is not stationary**.** \* Indicates rejection of H0 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 iii. 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 iv. 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**

***H01*: There is no long-run relationship between NSE Nifty and GVA by the Tertiary sector**

Table v. 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 H0 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

*H02*: 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 vi: 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)  C (2)  C (3)  C (4)  C (5)  C (6)  C (7) | -0.356316  -0.476983  -0.346817  -1.059779  -0.510002  2186.985  9214.840 | 0.0000  0.0000  0.0030  0.0023  0.0604  0.0002  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:

*****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 coefficient is between zero and minus one, the equilibrium path is converging to the long-run equilibrium path, and the equilibrium is responsive to the external downturn. 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 vii: 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 viii:

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 ix:

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

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



Source: Author’s own computation

*Interpretation*: - The model's residuals are regularly distributed.

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



Source: Author’s own computation

*Interpretation*: - In this study, the cumulative sum (CUSUM) and 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

*H03*: There is no cause-and-effect relationship between NSE Nifty and the Tertiary sector

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

|  |  |
| --- | --- |
| Coefficient of  Error correction term | Prob. |
| - 0.35\* | 0.00 |

Source: Author’s own computation**.** \* indicates rejection of H0 at a 5% significance level

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

|  |  |
| --- | --- |
| Chi-Square | Prob. |
| 16.87 | 0.00 |

Source: Author’s own computation**.** \* Indicates rejection of H0 at a 5% significance level

*Interpretation* - The 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, H0 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.

**Conclusion**

In this study, the association between NSE Nifty performance and tertiary sector growth was studied. For the Indian context, this study looked at the causal link and the short- and long-run dynamics between the variables. The empirical analysis was conducted in a yearly series for the years 2000-2001 to 2020-2021. The results of the ADF and PP tests revealed that the observed variables are of order one, i.e., I. (1). This indicates that the study's variables are non-stationary (unit root) at their levels and then stationary at their first difference, indicating that the study can determine 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 Error correction term between NSE Nifty and Tertiary sector reveal that the NSE Nifty granger causes the Tertiary sector in both the short and long run.

The findings of this study support the ‘supply following’ concept in the Indian setting, both in the short and long run. The study's findings imply that NSE Nifty growth has significantly determined the GVA generated by tertiary sector movements. NSE Nifty growth is more likely to stimulate and promote tertiary sector development by implementing proper investment policies.

**Policy Implications of the Study**

The current study provides implications for the 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 the 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.

**Limitations & 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.

***Author’s declared contribution:***

**Dr. Sudha Swaroop** — Problem identified, developed the research framework, conducted a review of literature, data, analysis, and interpretation

**Prof. (Dr.) Priya Solomon —** The research results were discussed and implications provided.

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