



Comparative Analysis of Return, Volatility, and Market Capitalization: Public vs. Private Sector Banks

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ABSTRACT

The Return, volatility, and market capitalization of two indices of the NSE public and private sector banks are studied. Daily closing prices of both indices are used for analysis from 1 January 2018 to 31 December 2019. In this study, several tools are employed such as Descriptive statistics, ADF test, and ARCH- LM test. The study reveals that the Nifty public sector bank index is highly volatile when compared with the Nifty private sector bank index. The results of the ARCH- LM test indicate that the return series of private sector banks show heteroskedasticity but in the case of public sector banks, it is found homoskedasticity which indicates that variance remains constant over the period. Additionally, analysis reveals that the overall market capitalization of HDFC Bank is more than all public sector banks which means that the stock of HDFC Bank is safer than the other banks.

Keywords: Heteroskedasticity, Volatility, Market Capitalization.

Introduction

In recent years, the field of finance has seen a significant increase in research on forecasting and modeling the volatility of time series data. This has become possible as volatility is playing a significant role in risk management, portfolio optimization, and asset pricing. In banking and finance, understanding the dynamics of return, volatility, and capitalization is critical for investors, regulators, and policymakers. When considering public and private sector banks in particular, these two crucial indicators offer insightful information on the stability, risk profile, and growth potential of financial institutions. The relationship between return, volatility, and market capitalization in the banking sector, particularly comparing private and public sector banks, is a topic of significant interest. Studies have shown that the privatization of public sector banks can significantly influence stock prices, with private sector banks experiencing positive abnormal returns on event days (Kumar & Pandey, 2021). In India, the systemic risk of banks varies between these two categories of institutions viz. public and private sector banks, with different determinants influencing their risk profiles (Dash, 2019). The concept of systematic risk is related to the stock market where accounting numbers play a crucial role in understanding stock prices, with variables like book value per share, earnings per share, and return on equity which significantly affects stock prices in both private and public sector banks (Bhatia & Mulenga, 2019). Private-sector banks show higher profitability compared to public-sector banks, indicating performance differences between the two sectors (Gupta & Mahakud, 2020). Public sector banks are perceived to be more secure by e-banking users in India, highlighting a potential trust advantage over private sector banks (Kumar & Gupta, 2020). In terms of market capitalization, private sector banks have demonstrated greater efficiency than public sector banks based on their higher return on assets and net interest margin, although they are comparable in terms of return on equity (Ramakrishnan & Toppur, 2016). Bank capitalization has been linked to increased lending capacity, positively impacting stock market liquidity growth (Soliman & Obi, 2017). Furthermore, the growth of the banking industry is influenced by factors such as stock market capitalization and government expenditure (Gwachha, 2022). The banking sector's return, volatility, and market capitalization are influenced by distinct factors varying between the private and public sectors. Understanding these differences is essential for investors, policymakers, and stakeholders in assessing the performance and stability of banks in the financial market. The present research paper is endowed to assess and analyze the performance of these two categories of banking institutions in terms of their return, volatility, and market capitalization.

Review of Literature:

The literature related to the research problem has been reviewed below:

Khan & Javed, (2017) have conducted research entitled "A study of volatility behavior of S&P BSE BANKEX return in India: A pragmatic approach using GARCH model" by using secondary data from 03rd May 2012 to 08th Jan 2016 and both ARCH and GARCH models were implemented. The results showed that the return volatility of S&P BSE Bankex exhibited not just ARCH and GARCH effects but was also significantly affected by the

volatility of the domestic market, as indicated by SENSEX. Moreover, the study revealed that external factors played a role in influencing volatility, with noticeable impacts from the Nasdaq and Shanghai Stock Exchanges in the global market.

Goyal & Kumar, (2019) have investigated the Indian Banking sector's volatility by using the daily closing prices of NSE Nifty as a proxy collected from Yahoo Finance. They used a GARCH model and an EGARCH model to measure the symmetric and asymmetric effects. Their findings indicated that returns series showing excess peakedness, heteroskedasticity, and volatility clustering, the AMA (2,2)-GARCH (1, 1) model is best for modeling the symmetric volatility. Further, they found an asymmetric effect in the return which means bad news had more impact than good news on volatility. Additionally, according to them, the result of ARCH-in mean and E-GARCH-in-mean indicated that there is a risk premium available in the Indian market.

Lingaraja et al. (2020) studied the impact of demonetization on stock price volatility of five public sector banks based on their capitalization from the BSE index viz. State Bank of India, Bank of Baroda, Punjab National Bank, Central Bank of India, and IDBI Bank. They used secondary data in their study which is taken from BSE websites and sources such as journal articles and books. They used descriptive statistics, the ADF test, and GARCH to capture the volatility of the stock market. The study found that the announcement of demonetization did not significantly impact the stock prices of public-sector banks.

Rehman and Siddiqui (2021) have assessed COVID-19 impact on the return and volatility of Financial Markets by using the simple ordinary least squares regression method. In this study, they included independent variables of Global COVID-19 confirmed cases, Fatality, Country COVID-19 new cases, and Country Fatality dependent variables including the country's market volatility and market returns. Control variables of Exchange and Interest rates were also included by them. The study revealed that global COVID-19 cases significantly affect a country's market volatility. They also found that Global fatality exacerbates the market volatility and country-specific fatalities don't seem to be substantially affecting volatility. Additionally, country-specific cases appear to hurt that country's volatility. Aside from that, the volatility appears to increase by interest rates and exchange rates according to them.

Gupta et al., (2022) used the seven BSE strategy indices to examine the volatility of Indian stock markets from March 2015 to January 2021 during the COVID-19 pandemic by employing the ARCH, and GARCH models. Their findings indicated that during the crises the return of all the strategic indices was negative, which shows significant losses attributed to COVID-19. Additionally, they found that during the specified period, there was an increase in volatility across all strategy indices, implying that the effects of the pandemic are enduring and may require considerable time to subside.

Yıldırım and Bekun (2023) examined the volatility of Bitcoin returns by employing the symmetric, and asymmetric models, using weekly Bitcoin price data from 2013 to 2020. ADF test confirms the data stationarity. Their finding indicates that the γ parameter of the EGARCH (1,1) model showed a statistically significant asymmetric effect of return volatility. Additionally, they also found that asymmetric GARCH models outperform symmetric ones and the EGARCH (1,1) volatility model emerges as a viable alternative.

From the above studies, it can be asserted that researchers have examined the performance of return volatility and market capitalization concerning the public and private sector banks. It is also obvious that ARCH, GARCH, and EGARCH have been applied in earlier research to examine the effects. However, since the subject area is highly volatile and the influences change quite rapidly with time external factors have also a bearing on such influences. In such a situation there always remains a need to analyze the performance of return volatility and market capitalization especially of the sector which is considered as the purveyor of providing funds. Keeping this in view the present research has been conducted.

Objectives:

- To study the heteroskedasticity and volatility of return of both the private and public sector banks
- To measure the performance of the private and public sector banks based on return, volatility, and market capitalization.

Methodology Used:

In this study daily closing prices of the Nifty public sector banks index and Nifty public sector banks are used for calculating the daily log return from 1st January 2018 to 31st December 2019. The NSE official website has been consulted to gather the daily closing prices for the measurement of volatility.

Measurement of volatility

Volatility i.e. fluctuation in the daily closing prices of private and public sector banks in the NIFTY index over 2 years. The volatility of both the return series is measured with the help of the standard deviation of returns. The return is measured using the formula, $R_t = \log\left(\frac{P_t}{P_{t-1}}\right)$. Apart from Standard deviation, the other tools used include the ADF test, and the ARCH -LM test method.

Results and Discussion:

Figure 1 Volatility clustering of Daily Returns of NSE Private Sector Bank Index (01/01/2018 to 31/12/2019)

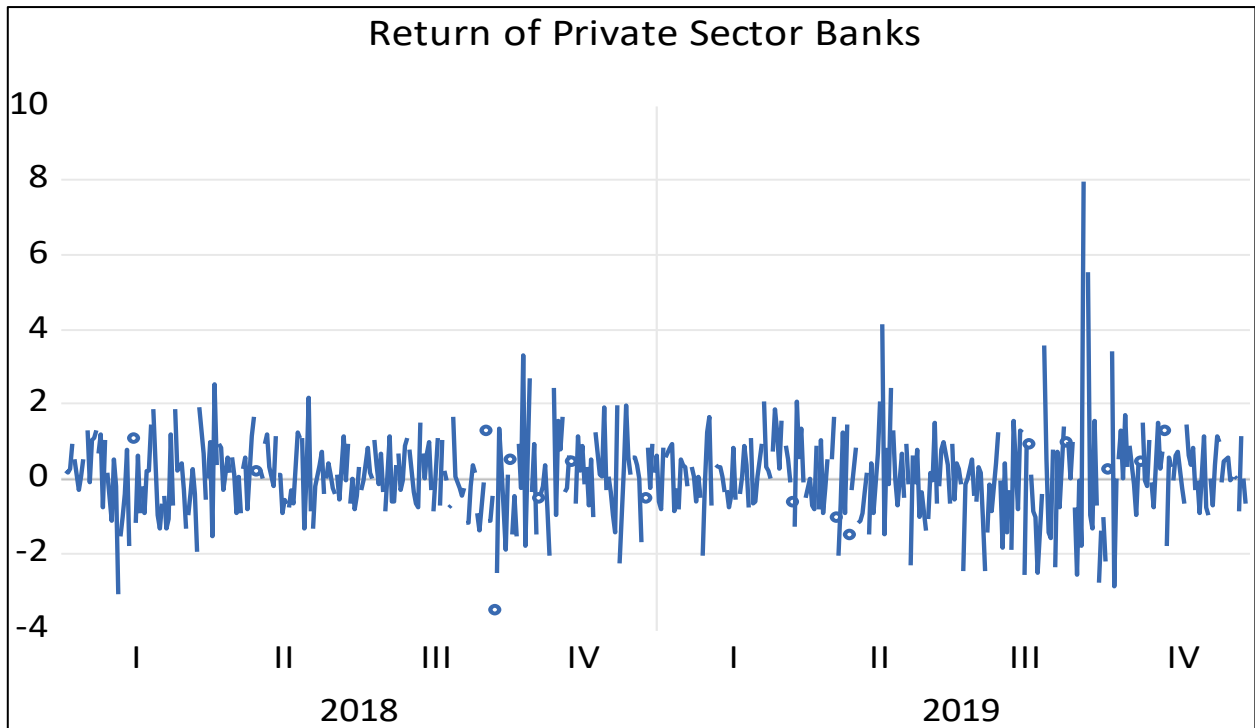


Figure 2 Volatility clustering of Daily Returns of NSE Public Sector Bank Index (01/01/2018 to 31/12/2019)

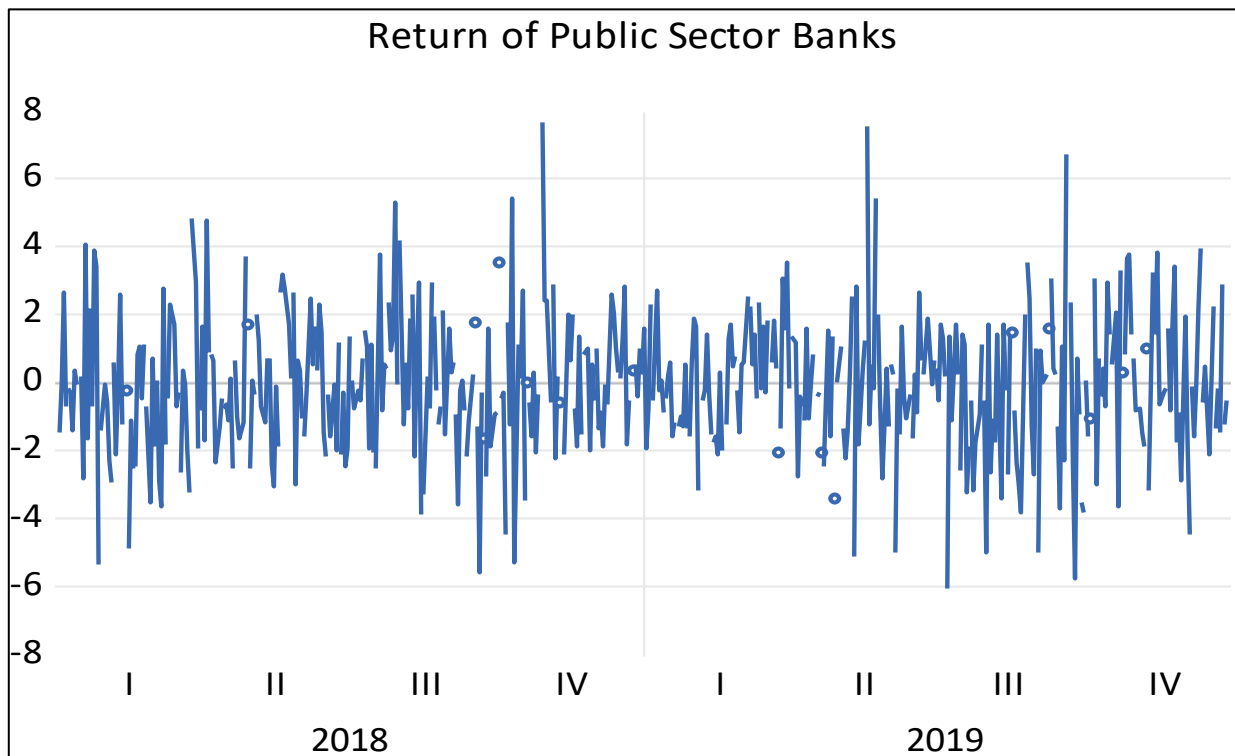
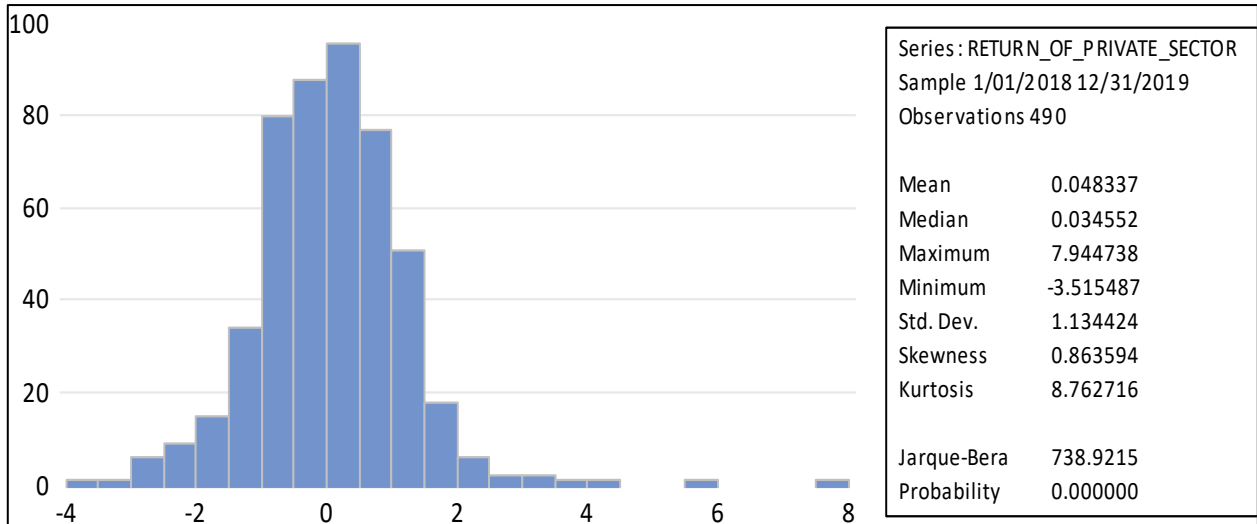


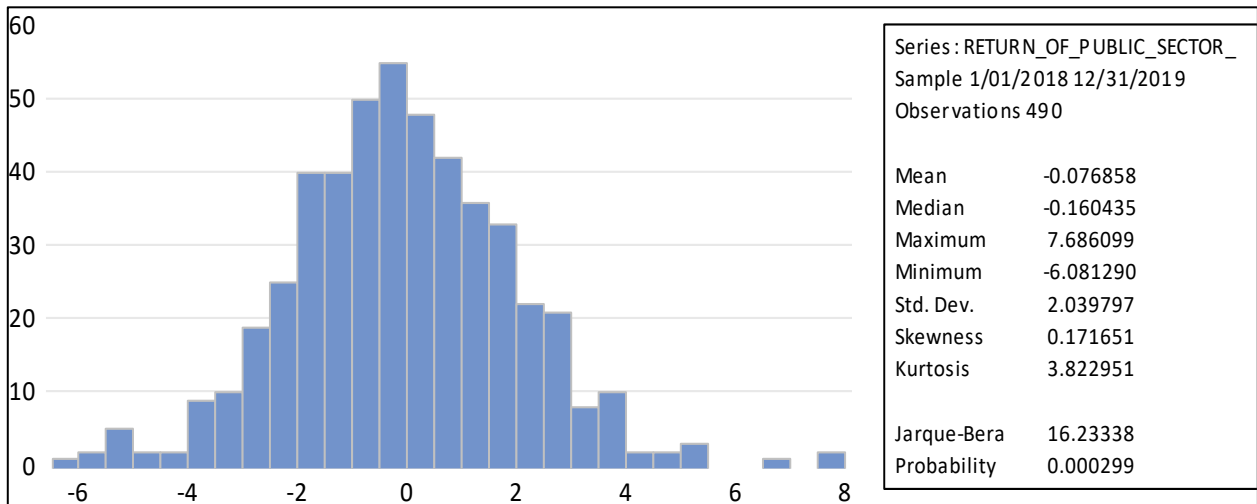
Figure 1 & Figure 2: The plot analysis of the daily return series of the NIFTY index for the public and private sector banks reveals a pattern of volatility clustering, with high volatility intervals followed by low intervals and high volatility periods followed by low intervals.

Table 1 Descriptive Statistics of Daily Returns of Private Sector Banks



Source: Compiled by the author

Table 2 Descriptive Statistics of Daily Returns of Public Sector Banks



Source: Compiled by the authors

The mean return of the NSE private sector banks index is positive [Table 1](#) but the mean return of the NSE public sector bank index is negative [Table 2](#) during the study period indicating the fact that the price has decreased over the period. The descriptive statistics show that the returns of both indices are positively skewed and have a long right tail, suggesting a higher likelihood of positive outcomes for investors. Further, the standard deviation of both indices is positive but as compared to private sector banks, the standard deviation of public sector banks is higher which indicates that the return of public sector banks is highly volatile as compared to the return of private sector banks. The kurtosis value of both return series exceeds three, with a higher value in private-sector banks, indicating a more leptokurtic distribution compared to the normal distribution, which is more prevalent in the private sector. The p-value of Jarque statistics for both is below the significance level, indicating that the return series is not normally distributed.

Table 3 Result of Augmented Dickey-Fuller unit Root test for return series of the private sector and public sector Banks' Index

Value	Private Sector Banks	Public Sector Banks
t-Statistic	-21.47968	-22.33410
Prob.*	0.0000	0.0000
Critical value @		
1%	-3.443496	-3.443496
5%	-2.867231	-2.867231
10%	-2.569863	-2.569863

The ADF test is used to check the stationarity of return series for the NIFTY public sector and private sector banks Indices across the two years. The result of the ADF test as shown in [Table 3](#) indicates that there is the existence of stationarity in the return series of both indices. Here the calculated p-values of the ADF test of both indices (0.000 in both cases) are less than 0.05 which indicates that the data of the time series under the study are not unit root i.e. stationary.

Table 4 ARCH L-M test for return series of Private Sector and Public Sector Banks index

Heteroskedasticity Test: ARCH	Private Sector Bank Index	Public Sector Bank Index
F-statistic	23.38387	1.090215
Obs. *R-squared	22.40414	1.092247
Prob. F (1.487)	0.0000	0.2969
Prob. Chi-Square (1)	0.0156	0.2960

The test of ARCH effect.

The heteroskedasticity in the return series is checked with the help of the ARCH- LM test as per [Table 4](#). The result of the ARCH L-M test exhibits that heteroskedasticity is found in private-sector banks because the p-value of 0.000 is lower than the 0.05 level of significance which shows the ARCH effect. However, the ARCH -LM test p-value for the public sector Banks, is 0.2969 is more than 0.05 percent level of significance indicating that there is no ARCH effect in the returns series of public sector banks.

Table 5 Market Capitalization of Public Sector Banks

Banks	Market Capitalization
State Bank of India	2620705129359.10
Bank of Baroda	297488289043.40
Punjab National Bank	287661152775.00
Canara Bank	183421180466.25
Bank of India	179178176333.20
Indian Bank	108257738135.40
Central Bank of India	92445176847.50
Indian Overseas Bank	85813796905.20
UCO Bank	75345425534.40

As per above [Table 5](#), State Bank of India has the highest market capitalization at INR 2,620,705,129,359.10 followed by Bank of Baroda with a market capitalization of INR 297,488,289,043.40 among the 9 public sector banks. The higher market capitalization of SBI shows that its stocks are considered safer compared to others with lower market capitalization. SBI Bank is known for its innovative market leadership, and its targeted marketing strategies have the potential to impact the bank's stock price positively.

Table 6 Market Capitalization of Private Sector Banks

Banks	Market Capitalization
HDFC Bank Ltd	5654329400952.75
Kotak Mahindra Bank Ltd	2394948425194.50
ICICI Bank Ltd.	2347095589008.55
Bandhan Bank Limited	481833557128.80
IDFC First Bank Limited	216124776500.80
City Union Bank Ltd	139790598450.00
Federal Bank Ltd	170472796122.90
RBI Bank Limited	241923550767.15

Axis Bank Limited

1857249483487.20

Amongst the private sector banks, as shown in [Table 6](#), HDFC Bank shows the highest market capitalization, at INR 5654329400952.75 followed by Kotak Mahindra Bank Ltd, with a market capitalization of INR 2394948425194.50. The higher market capitalization of HDFC Bank indicates that its stocks are considered safer compared to other private sector banks with lower market capitalization. Investors seeking long-term investment opportunities in the private sector banking industry may find HDFC Stock an ideal choice.

Market Capitalization of Public and Private Sector Banks:

HDFC and SBI, among the 18 private and public sector banks, have the highest capitalization, suggesting that their stocks are more secure than other banks. However, HDFC Bank stands out with its overall high capitalization, making it a preferable choice for investors seeking long-term investments in the banking sector.

Conclusion and Suggestions:

The results of the analysis show that the average returns of NIFTY private sector banks are positive indicating a higher probability of earning positive returns in the future, but in the case of NIFTY public sector, the return is negative meaning that there is a higher probability of getting negative returns. Further, both series have the volatility feature in the return series, but the NIFTY public sector index is highly volatile as its standard deviation value is higher than that of private sector banks. The results also suggest that both series are stationary, but the results of the ARCH-LM test indicate that the return series of private sector banks have heteroskedasticity but in the case of public sector banks it is found homoskedasticity which indicates that variance remains constant over the period. Furthermore, the analysis reveals that the total market capitalization of HDFC Bank is higher than that of all public sector banks, which means that the stock of HDFC Bank stock is safer than that of the other banks. The analysis shows that private-sector banks outperform public-sector banks in overall performance. Since SBI Bank is known for its innovative market leadership, and its targeted marketing strategies have the potential to positively impact the bank's stock price, investors looking for long-term investment opportunities in the public sector should consider SBI Bank shares. Not only this, the other public sector banks need to follow the strategy of SBI. In the category of private sector banks, HDFC shares may be an ideal choice for investors looking for long-term investment opportunities.

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