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EXPLORING THE RELATIONSHIP OF MULTIPLE TIME DURATION RETURNS, AND ANNUAL VOLATILITY INTER SE FOR VARIOUS INDICES ON THE NATIONAL STOCK EXCHANGE

Deepak K. Amin, Dr. Hemal Pandya

Research Scholar,
S D School of Commerce, Gujarat University, Ahmedabad – 38009, Gujarat, Bharat.

Professor,
S D School of Commerce, Gujarat University, Ahmedabad – 38009, Gujarat, Bharat.

Abstract

Stock exchanges are the epicenter of any capitalistic and free market model economy and the variety of indices maintained by them serve as the barometer. NSE, the largest stock exchange in India maintains and publishes prices changes data for 87 stock indices constituted based on different themes, strategy, and sectors including the benchmark NIFTY-50. The main objective of this study is to understand relationship for returns of 1 month, 3 months, 1 year, 3 years, 5 years and 1-year volatility inter se. The study interestingly reveals that there is impact of quarterly returns of the indices on annual returns. On the contrary it is unaffected by monthly returns. On the volatility front short term returns were seen affected by annual volatility while long term returns did not with exception of 5 year figures.

Keywords*: NIFTY-50, NSE Indices, Stock Market Volatility, Index Returns.*

JEL Classification*: D53, G10, G11, G17.*

1. INTRODUCTION

Any capitalistic and free market model economy is characteracterised mainly by the free movement of the factor of capital. There is usually a financial system encompassing a capital market to aid, facilitate and foster this movement. Stock exchanges, in bookish parlance have been known as the barometer of the economy. To add further they are also epicenter of the agglomeration of the factor of capital. In India there are two major stock exchanges viz., National Stock Exchange (from here on referred to as NSE) and BSE Ltd. (from here on referred to as BSE). Of NSE and BSE, the former boasts of the majority of trading turn over. Also, the index products of NSE are widely followed, more traded and benchmarked. Hence, for this study the indices of NSE are chosen, the detail of which are given in research methodology section.

There are hundreds of corporate listed on these bourses. Their stocks are traded daily and they go up and down every day. This gives or in theory is meant to give a suggestion about the company's business prospects which helps investors make decision. The stock exchanges also maintain indices which have individual stocks as their constituents. The values of these indices also oscillates as the price of the individual constituents changes in proportion to their weightages in the given index. Hence, due to the very importance of these indices, it is necessary to understand their relationship inter se. In addition, these returns, if observed under the light of annual volatility will give further insight to aid the results derived in former proposal. This is what is being tried to accomplish in this study.

Upon reviewing the literature, it is found that stock exchange indices have not been a very favorite subject of the academic researches. The scientific study of indices did not result initially from the stock market's importance in finance (for firms financing, for savers' portfolio choices or for investment banks' decisions), since most of the initial interest came from economists that looked at the stock market only as a measure or an index of the macroeconomic situation. The development of indices dedicated to financial studies came only in the late 1920s, and accelerated only with the birth of modern finance (Pierre-Cyrille Hautcoeur, 2011). While the results are presented and interpreted in another section, Jones, Kaul, and Lipson (1994) Xiaoqing Eleanor Xu , Chunchi Wu (1999) found that the frequency of trades has a high explanatory power for return volatility. While Prakash Apte (2012) investigated stock market volatility and its impact on foreign exchange market using the E-Garch specification proposed by Nelson (1991), derived mixed results, it has been tried to keep it simple by using One Way ANOVA. A one-way ANOVA (analysis of variance) compares the means of

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two or more groups for one dependent variable. A one-way ANOVA is required when the study includes more than two groups. (In other words, a t-test cannot be used.) As with t-tests, there is one independent variable and one dependent variable. Interval dependent variables for nominal groups are required. The assumption of normal distribution is not required (Amanda Ross and Victor L. Willson, Basic and Advanced Statistical Tests (2017)).

2. RESEARCH METHODOLOGY

2.1. Objectives of the study

- To study the relationship between different types of indices of NSE.
- To study the relationship between the returns of different time durations of the indices.
- To study the effect of annual volatility on the returns of different duration of the indices.

2.2. Sample design

The study covers 87 indices by different classification. Below are the classifications. The sample collection is non probabilistic purposive type.

Broad Market Indices	Thematic Indices	Strategy Indices	Sectoral Indices
17	30	22	19

2.3. Data collection

The study has used secondary type of data. This was collected from NSE's Index Dashboard Publication. The data points are recorded as on 31 October, 2023. The volatility figure is for one year while returns taken are for 1 month, 3 months, 1 year, 3 year and 5 years. All returns data presented were on total return index basis.

2.4. Research tools used

The study has used One Way ANOVA (Analysis of Variance) for explaining the objectives of the study.

2.5. Research Gap

Many studies have been carried out regarding forecasting of stock returns and volatility, pricing of short run and long run market risk components, finding effect of non-equity variables volatility on equities and so on. However, this study has aimed a very niche, narrow, and tied approach. There is not just ostensible but apparent dearth of research attempts trying to test identical objectives that this study has explored.

2.6. Significance of the study

The study helps long term investors to understand whether they should heed to short term returns and volatility numbers while basing their investment decision making.

The study helps short term traders/investors to understand the effect of volatility on the market during a shorter period.

3. DATA ANALYSIS AND INTERPRETATION

3.1. The relationship between short term return of the indices on their annual returns.

H1a: There is significant effect of 1 months returns on 1 year return of selected indices.

Table No. 1. ANOVA

Returns (%) 1 Yr

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14035.780	80	175.447	1.431	.327
Within Groups	857.940	7	122.563		
Total	14893.720	87			

The significant vale is 0.327, which is higher than table p value 0.05, hence the null hypothesis is accepted. Further it is noted that There is no significant effect of 1 months returns on 1 year return of selected indices.

H1b: There is significant effect of 3 months returns on 1 year return of selected indices.

Table No. 2. ANOVA

Returns (%) 1 Yr

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14879.646	84	177.139	37.757	.006
Within Groups	14.075	3	4.692		
Total	14893.720	87			

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The significant vale is 0.006, which is lower that table p vale 0.05, hence the null hypothesis is rejected. Further it is noted that There is significant effect of 3 months returns on 1 year return of selected indices.

Commentary on results

It was observed that the return for 1 year is affected by 3 months returns of the given indices. While it is not affected by 1 month returns of the given indices. According to this, the investors should ignore the daily, weekly and monthly ups and downs of the stocks. But at the same time they should heed to three monthly variations in stock prices for investment decisions. It can be pointed out that the fact that quarterly returns are showing impact on annual returns are also a reflection of how quarterly results estimation, expectation and publication have become vital to stock price movement and their importance on annual return of the security. This is because four quarters make up for one years and it can be assumed that this trend might be underlying on trailing quarters basis as well over multiple year durations. This phenomenon is also sign of maturing Indian capital markets in line with their western counterparts.

3.2. The relationship between annual volatility of the indices with their short term and long term returns.

H1a: There is significant effect of 1-year Volatility on 1 month return of selected indices.
H1b: There is significant effect of 1-year Volatility on 3 month return of selected indices.
H1c: There is significant effect of 1-year Volatility on 1 year return of selected indices.
H1d: There is significant effect of 1-year Volatility on 3 years return of selected indices.
H1e: There is significant effect of 1-year Volatility on 5 years return of selected indices.

Table No. 3. ANOVA

Source of Variation		Sum of Squares	df	Mean Square	F	Sig.
1M	Between Groups	344.050	80	4.301	6.085	.009
	Within Groups	4.947	7	.707		
	Total	348.997	87			
3M	Between Groups	1676.826	80	20.960	7.374	.005
	Within Groups	19.898	7	2.843		
	Total	1696.724	87			
Returns (%) 1 Yr	Between Groups	14049.004	80	175.613	1.455	.317
	Within Groups	844.716	7	120.674		
	Total	14893.720	87			
3 Yr	Between Groups	12848.998	80	160.612	2.947	.066
	Within Groups	381.478	7	54.497		
	Total	13230.476	87			
5 Yr	Between Groups	2928.261	79	37.067	5.381	.012
	Within Groups	48.216	7	6.888		
	Total	2976.477	86			

H1a:
The significant vale is 0.009, which is lower that table p vale 0.05, hence the null hypothesis is rejected. Further it is noted that There is significant effect of 1-year Volatility on 1 month return of selected indices.
H1b:
The significant vale is 0.005, which is lower that table p vale 0.05, hence the null hypothesis is rejected. Further it is noted that There is significant effect of 1-year Volatility on 3 month return of selected indices.
H1c:
The significant vale is 0.317, which is higher that table p value 0.05, hence the null hypothesis is accepted. Further it is noted that There is no significant effect of 1-year Volatility on 1 year return of selected indices.
H1d:
The significant vale is 0.066, which is higher that table p value 0.05, hence the null hypothesis is accepted. Further it is noted that There is no significant effect of 1-year Volatility on 3 years return of selected indices.
H1e:
The significant vale is 0.012, which is lower that table p vale 0.05, hence the null hypothesis is rejected. Further it is noted that There is significant effect of 1-year Volatility on 5 years return of selected indices.

Commentary on results

It is understandable that annual volatility to be expected to strongly tied up to monthly or three monthly stock returns. This conclusively shows overwhelming impact of trading turnover and short term sentiments' overarching

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command. However, 5 yearly returns have also shown relationship with annual volatility which is difficult to interpret. Annual volatility matching with annual returns (as in not having impacted) is an affirmative sign that markets remained volatile over and above quarterly duration in a fashion that adjusted a lot of unnecessary 'noise', overtrading, huge swings, and speculative highs of traders.

4. CONCLUSION

This research study concludes that the one-year return of given indices is influenced by the three-month returns but not affected by one-month returns. The recommendation is for investors to disregard daily, weekly, and monthly fluctuations in stock prices and instead pay attention to three-month variations for investment decisions. The impact of quarterly returns on annual returns highlights the significance of quarterly results estimation and publication in shaping stock price movements. This trend reflects the maturing of Indian capital markets in line with western counterparts. The study also finds that annual volatility affects short-term (1-month and 3-month) returns, indicating the strong influence of trading turnover and short-term sentiments. However, the absence of an impact on 1-year and 3-year returns suggests that markets remained volatile over quarterly durations, reducing unnecessary noise and speculative activities. Although, the presence of impact on longer-term (5-year) returns could not be explained and requires further study.

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