

IMPACT OF TECHNOLOGY AND INVESTOR BEHAVIOR ON STOCK MARKET VOLATILITY

Author

Shashidhara H S

Research Scholar

Department of Research

& Studies in Business Administration

Tumkur University

Co – Author

Dr. Shiva Shankar K.C.

Assistant Professor

Department of Research

& Studies in Business Administration

Tumkur University.

Abstract:

This study is been conducted to forecast the market volatility and the investments behavior. The Stock Market is the pioneer in the field of capital markets bringing together industry domain experts to impart comprehensive training on investing in several financial instruments through in-depth information in a real-time interactive environment the stock markets are largely depend on the flow of market information. The information flow has got its effect in the returns of the investors. In the market efficiency analysis, it is evident that the investors cannot earn abnormal returns as the market information is available to everyone. Banking sector is considered as one of the major indicators of economic development. The performance of various banking sectors are over the study period has witnessed significant volatility as many major reforms were initiated by the Reserve Bank of India. Hence the present study analyzed the findings evidenced the share prices of selected sample banking companies were independent. The results of the study were helpful in deciding the timing of investments in banking stocks for investors. To help preserve the value of your investment portfolio and maximize its growth potential over time, it's important to stick with a personalized, goals-based investment strategy during periods of economic stability as well as short-term market fluctuations. These investment strategies can help you reduce investment risk and earn more consistent returns over time knowing your risk tolerance is crucial to investing. Learn how risk tolerance, asset allocation strategies, and a diversified portfolio are all connected.

Index Terms - Volatility, Stock Market, Industry performance, Banking Sector, Technology, Investment Pattern and analysis of behavior.

I. INTRODUCTION

The stock market, just like other markets and realms, has been vastly influenced by technology. Recent years have especially been all about technology and its benefits. Considering how much technology is entrenched in the day to day aspects of trade, it is almost inconceivable to think of how the market was a decade ago. The kind of efficiency that has been brought by technology has not only made the market more efficient, but it has also helped it grow by leaps and bounds. If the technology were to be removed today, the losses that would be experienced in the market would be colossal. But how exactly is technology impacting the daily activities in the stock market? Let us analyze the key ways that tech is shaping the market. Volatility is the extent to which the return on an underlying asset fluctuates over a given period of time. It is most commonly calculated as the annualized standard deviation of returns and represents the risk associated with that particular asset. Historically, financial price series have shown great variation in volatility over time. Furthermore, there is significant evidence of volatility “clumping”. This means that periods of high volatility tended to occur together, as do periods of low volatility. As volatility represents risk, the phenomenon of clumping is very relevant to market participants. This is because volatility is a key component of many financial decisions, asset pricing, risk management, portfolio selection and hedging strategies. Modeling and forecasting stock price volatility in financial markets is one of the most important and baffling tasks in financial research. Recently, a great deal of attention has been directed to this area by academicians, policy makers and practitioners over the globe, because it can be used as a measure of risk and also can exhibit some typical characteristics. Basically, the volatility forecasts are sensitive to the specification of the volatility model. Hence, it is important to strike the right balance between capturing the salient features of the data and over fitting the data. As

the estimated parameters are the true parameters of the volatility's models, which often change the volatility forecasts are anchored at noisy proxies or estimates of the current level of volatility. Even with a perfectly specified and estimated volatility model, forecasts of future volatility inherit and even amplify the uncertainty about the current level of volatility.

Research Methodology

The Stock market is an important component of the economic system of a country. The stock market plays a pivotal role in the development of the industry and commerce of the area that eventually affects the economic system of the country to a great extent. The Stock market is viewed as a very important component of the financial sector of any economic system. Furthermore, it plays a vital role in the mobilization of capital in many of the emerging economies. There are many factors which affect the stock market behavior rapidly. The variation due to the different factors reflects its impact on the economy also. It is said that if one wants to discover the economic structure of the country, he/she should read out the behavior of the securities markets. So, in the above context, there is a need to conduct present research to investigate the relationship between stock exchanges and financial factors.

Objectives of the study

The study will be conducted with a view of the following objectives: -

- To examine the stock markets of India, U.S. and U.K. with regard to State influence.
- To identify and analyze the financial factors in selected stock markets.
- To investigate the relationship among India, U.S. and U.K. stock markets on financial factors.

- To analyze the impact of financial factors on selected stock markets.
- To recommend an action plan for sound investment decisions in international scenario.

Research Methodology

To accomplish the above objectives of the study, the following research methodology is proposed:

Sampling Technique

For attaining different objectives New York Stock Exchange (NYSE), Bombay Stock Exchange (BSE), National Stock Exchange (NSE) and London Stock Exchange (LSE); belongs to the U.S., India, and the U.K. as per their benchmarks DJIA, Sensex, S&PCNX Nifty, FTSE100 respectively will be taken into consideration because these stock exchanges are the largest stock exchange in the world by both market capitalization and trade value.

Data collection for Research

For the purpose of the study secondary data will be taken into consideration.

Secondary Data: Secondary data will be collected from reports and researches published in journals, web sites periodicals, magazines, newspapers, Annual Financial Reports, and other reports of selected companies.

Tools for Analysis

For achieving the above-mentioned objectives, different set of techniques and tests will be used. That will be descriptive statistical techniques and inferential statistical techniques. Graphical and tabular mode will also be used for presentation of information.

This study is entirely based on secondary data and its empirical study. All the data used for this study was acquired from the official website of respective stock markets finance. The daily market data were collected for the period between 1 April 2000 and 31 March 2018 (4624 daily observations). Suggested that at least eight years of data should be used to estimate GARCH models.

The market return was calculated as per the following equation (1)

$$R_t = (P_t) - (P_{t-1}) / (P_{t-1}) \dots (1)$$

Where R_t is the daily market index at time t . P_t denotes the market index at time period t , and P_{t-1} denotes the market index in the selected market at time period $t-1$. For analysis the data “Eviews 10” statistical software package was used to perform econometric analysis such as Augmented Dickey Fuller (ADF) test (Stationarity), correlation test (short-term relationship), Granger causality (cause and effect relationship), cointegration test (longrun relationship) and GARCH model (estimate volatility) was applied.

EMPIRICAL RESULTS

Descriptive Statistics

The descriptive statistics of stock market index returns are presented and the summary of the statistics of the market index return of all six stock markets. As per the table, the highest mean value is the Hong Kong stock market and the lowest in the American stock market. Among those six stock markets, India's Bombay stock exchange had more standard deviation; it means more volatility in the market and very high-risk market. S&P 500 had very low standard deviation which means very less risk compared with other markets. The skewness for the returns for all the stock markets are positive (nonasymmetric); only Hong Kong marker is negative which means it is asymmetric. The Jarque-Bera test for normality portrays a significance level of 5%, indicating the rejection of the null hypothesis that means the time series data of market indices are not normally distributed.

Analysis of Correlation Test

The correlation coefficient is used to measure the extent of the strength and direction of the association between the indices and stock returns in different countries. The analysis of Karl person's correlation is presented. Karl person's correlation among the BSE and other indices show that all the stock markets are positively correlated that means all the stock exchanges have a short run relationship. Among those exchanges, the Hong Kong market has highly associated with the Indian market almost 90%, whereas Europe stock market is least correlated. So, the Indian market does have the linkage virtually with every stock market.

Augmented Dickey-Fuller Unit Root Test

Before examining the market linkage among the Indian stock market and selected stock markets, it is essential to check the univariate properties of the data series are non-stationary, or they contain a unit root. For that, ADF unit root test is employed, which was developed by Dickey-Fuller. A time series is said to be stationary that means, the variance of the series does not symmetrically differ over time. Nonstationary data will lead to incorrect concluding. (Dickey & Fuller, 1979).

Where δY_{t-1} is the first difference operation, β_1 , β_2 are coefficient to be estimated. $\delta = 0$, ϵ_t is white noise error term, if the estimated slope of coefficient in this regression δ (hypothesis) is zero or not. If it is zero, then Y_t is non stationary. The optimal lag length was taken with the Akaike Information Criterion (AIC) and maximum lag was put to 36 (Gujarati 2009). The ADF null hypothesis is there as unit root in the time series, whereas, the alternative is - there is no unit root and it is stationary.

the t statistics and prob values of all the stock markets at both level and first level. From the table, all the probability value of 'At level' is not significant that means the data series is not stationary, it has a unit root. In the first difference, all the index probability value is less than 5%, that means it rejects the null hypothesis to accept the alternative, so the data becomes stationary after the first difference in ADF test.

Analysis of Granger Causality test

The Granger causality test is conducted to investigate the direction of causality between the Indian market and other major stock markets. This test checks that whether the today's Indian market return is influenced by previous day return of any other markets. This test is applied only to stationary time series data.

Where, Δ is the difference operator, T_{t-i} and X_{t-j} are represent as the lagged value of Y_t and X_t . ε_1 and ε_2 are error terms assumed white noise. The lag length was picked by using Akaike Information Criteria (AIC). The Granger Causality Test results in which shows that the European market has an impact on the Indian market. In the same way, the American market also causes the unidirectional effect. Hong Kong and Shanghai markets have an effect both the directions, so it's called bidirectional impact. That means any news of the Indian stock market will have an impact on both the market and vice versa. Results of Cointegration Test (Johansen, 1990) Cointegration test is the most widely used method in examining the long-run equilibrium relationship of the different time series or integration in the financial market. The result of the cointegration test, trace and maxeigenvalues are checked at 5% significant level. Here the null hypothesis is that 'these series are not integrated with the Indian market'. all the markets index probability values are more than 5% significant level, so it shows the data fail to reject the null hypothesis that means there is no long-run relationship between Indian stock market and other markets.

Estimation of volatility

Garch model is useful in analysing the financial time series such as market indices. A distinguishing feature of these models is that the error variance may be correlated over time because of the phenomenon of volatility clustering. The Arch model was developed by (Engle, 1982) and Garch model was initially proposed by (Bollerslev, 1986) the simplest model GARCH (1,1). Where σ_t^2 is the variance for the time t . α_i and β_j are coefficients. ε_{t-i} is the lagged residual from the mean equation and, σ_{t-j}^2 is the lagged variance from the period $t-j$. λ is the coefficient measuring the impact of Bombay stock exchange return on the volatility of other stock market indices. Estimated GARCH coefficient and prob value for returns are presented in Table 7. ARCH and GARCH coefficient were all significant at 5 per cent level, which means there is an autoregressive effect in all the so significant that means there is a strong volatility clustering effect was found in the data. The impact of BSE market return in other stock market was significant at 5% level in all the market, but it has a negative value, and so there is an adverse impact in the markets

Findings

From this study, it is found that in the short run period all the markets are integrated but not in the long run period. The reason being, almost all the investors, are anxious to speculate the shares and not holding for a long period. Also, in a long period, a lot of major economic variables such as GDP rate, countries economic policies, political vagaries, interest rate, employment rate, ecological imbalance, and technological advancement are some of the factors to makes the markets to perform independently. So, the investors are very sensitive in a short period, but in the long period, they are trained to predict the market movement precisely. Thus, the short run variation of the advanced nations like Europe and India has an effect on the Indian stock market. Therefore, the developing countries are dependent on the price movement of the stocks of developed nations.

CONCLUSION

This study was intended to examine the market linkage and volatile estimation of Indian stock market with other selected stock markets, globally by using various econometric models for the period from 1 April 2000 to 31 March 2018. It is found that the Hong Kong stock market is highly correlated with the Indian stock market. The data considered for the study was non-stationary, but while checking ADF at first level, it was stationary. The Granger Casualty test suggests that there is bidirectional causality between Hong Kong and Shanghai stock markets with the Indian market. Johansen Cointegration test revealed that there is no long-run relationship between any other markets with the Indian market. The volatility effect and clustering effect were found in the market indices. Thus, there is a negative influence made by the select stock market on the Indian stock. This reveals that the investors are abreast with the information on the

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