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Macroeconomic Variables and Securities Returns: An Impact Assessment

Anindita Adhikary[1], Neeta Dhusia Sharma[2] and Bedanta Bora[2]
[1]Professor, Department of Management Studies, Sikkim Manipal University,
SMIT Campus, Rangpo, Majitar, East Sikkim-737136, India.
[2]Associate Professor, Department of Management Studies, Sikkim Manipal University,
SMIT Campus, Rangpo, Majitar, East Sikkim-737136, India.

(Corresponding author: Bedanta Bora)
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ABSTRACT: Volatility is expressed as an extent of movement in the prices of shares from likely level of return. This study examined the effect of macroeconomic factors on instability of return in Indian securities market during the period 2001 to 2019. Stock market returns of Nifty index of the National Stock Exchange (NSE), India and macroeconomic variables namely inflation and interest rate of India are considered for the present research work. Volatility is investigated by the application of symmetric and asymmetric class of GARCH models. This study reveals the existence of leverage and asymmetric effect of macroeconomic factors on share market and concludes that positive and negative blows have unlikely effects on instability of the share prices in Indian market. There have been noteworthy changes in research efforts towards stock market dynamics and macroeconomic factors established in the past years. Documenting such changes has been a major challenge in the study. Nevertheless, the present research work contributes to the literature by integrating two most significant macroeconomic variables that define the volatility in Indian share market. Further, the study explored a large sample comprising a period of 19 years.

Keywords: Macroeconomic Variables, Nifty Index Return, GARCH, EGARCH and TARCH.

I. INTRODUCTION

In any country's financial system, stock market is the most versatile sector and plays a major role in economic development of the country concerned. Stock market is a place where facilities are provided to financiers to purchase and sell their shares, bonds and debenture. In other words, stock market is a platform for interchanging of numerous securities and derivatives with no obstacles. Various studies conducted by scientists have also shown that stock markets always play a major part in promoting the economy's financial development, creating capital formation and also enhancing the prosperity of the nations [1-3].

Volatility may be explained as fluctuation in security prices. It is the unpredictability or change in asset price. Volatility is understood to be the extent of frequent changes in prices and mentioned as market risk in finance.

It is a statistical tool to measure the returns for a given security or market index. Generally, if the volatility is higher, the greater will be the risk associated with security and vice versa. The estimation of volatility is significant for numerous reasons associated with different stakeholders in the stock market. Developed markets continue to provide higher returns constituting low volatility continuously over the long period of time. Now, the Indian market has also underway to become more efficient compared to developed countries in terms of acting on information.

The volatility of any stock market for a given time series is due to various micro and macro economic factors of the country concerned as well as world economy. For determining the cost of the capital of any securities and also in evaluating investment and leverage decisions of economies, proper sympathetic of volatility and its reasons are important.

Pal and Mittal (2011) examined that variations in Indian stock markets are exaggerated by changes in few macroeconomic variables [4]. Ray (2012) defined that unidirectional causality exists between stock price and inflation, FDI, GDP, and exchange rate [5].

II. LITERATURE REVIEW

Several empirical studies have been carried out by many policy makers and researchers to determine the linkage between macroeconomic variables and share market fluctuation and explained that macroeconomic variables play a vital role in asset pricing theories and have an immense impact on share prices.

Mandelbrot and Fama developed the work on time series of share market returns which regularly expresses volatility clustering [6, 7]. This implies that high fluctuation in the time series are projected to be pursued by high volatility and low volatility are projected to be pursued by low fluctuation. Such trend in the data series is expressed as Autoregressive Conditional Heteroscedasticity (ARCH) by Engle in 1982 [8]. The ARCH model was later developed by Bellerslev in the year 1986 and coined as Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model [9].

Exponential GARCH model or EGARCH model introduced by Nelson is the modified edition of the GARCH model that captures asymmetric property in stock market returns [10]. Zakoian (1990) established the Threshold ARCH (TARCH) model that considers the impact of optimistic and pessimistic alarms on instability. Family of GARCH models were an enhanced method of financial modeling [11, 12].

Abundant investigations were put forward by the application of ARCH and GARCH model in understanding the market unsteadiness. The family of GARCH models has been very useful in capturing the volatility in time series data. The studies proved that the GARCH (1, 1) is useful for evaluating conditional instability for various time series data.

Fama and French & Ferson and Havery found different interlinkage between securities returns and macroeconomic factors [13, 14].

Lee (1992) applied a ground-breaking approach to study the association between macroeconomic factors and securities prices. To study the selected variable relationship, VAR model was adopted. This technique foregoes many prior spurious structural limitations and has the ability to work with undrafted dynamic representation of data. Thus, it overcomes many limitations and is useful to study the pattern of interrelationships amongst the variables included in the model [15].

Fama (1991) conducted a research to study the link between basic economic activities and securities market return and recommended that stock prices imitate dividends, earnings and interest rate expectations as well as information about future economic activity. Affluence of investors is affected by stock returns and further affects the level of consumption and investment [16].

Mansor (1999) examined the vibrant connections between macroeconomic factors and securities prices for the evolving economy, Malaysia. Analysis was carried out by using granger causality tests and co-integration. Bivariate analysis suggests co-integration amongst securities prices and three macroeconomic factors – consumer prices, credit aggregates and official reserves [17].

Niarchos and Alexakis (2000) observed the prospect of forecasting share prices through the usage of macroeconomic factors for the Athens stock exchange on the base of monthly statistics from 1984 to 1994. The selected variables included for the study were inflation, money supply and exchange rate. A positive correlation among stock prices and known variables was originated by using co-integration technique and causality test statistics [18].

Wongbangpo and Sharma (2002) observed the association between the share markets and basic macroeconomic factors for several South East Asian countries – Indonesia, Malaysia, Philippines, Singapore and Thailand. Monthly Data for selected macro variable were GNP, consumer price index, money supply, interest rate and exchange rate for these countries. The outcomes specified that due to elevated inflation in case of Indonesia and Philippines, the long-run negative relation between stock prices and money supply is affected. However, in Malaysia, Singapore and Thailand the money growth conveys the optimistic effect on their stock markets. The exchange rate is negatively linked to stock prices of Singapore and Thailand and positively related to Indonesia, Malaysia and Philippines [19].

Mala & Reddy (2007) inspected the effect of interest rate variations on Fiji's share market volatility during 2001-2005. For study and analysis of the stock market volatility, ARCH models and its extension, the Generalized ARCH model were used. They concluded that interest rates changes have a noteworthy consequence on stock market volatility. However, they have just taken a single macro variable for their study to portray the causes of stock market volatility [20].

Rad (2011) observed the associations between Tehran Stock Exchange (TSE) price index and the three macro economic variables (Consumer Price Index, free market exchange rate and liquidity i.e. M2). Period of study was monthly data for a period from 2001 to 2007. VAR model was used for analysis. The impulse response analysis indicated that the response of TSE price index to stun in the three macro economic variables is frail [21].

Hosseini *et al*., (2011) observed associations between share price index and macroeconomic variables (crude oil price, money supply, industrial production and the inflation rate) for the countries namely China and India. Period of study was from 1999 to 2009 [22].

Anshul and Biswal (2016) explored the relationship between global gold prices, crude oil, the USD–INR exchange rate, and the Sensex 30 over 10 year daily data series. The association has been established using DCC-GARCH (GARCH, EGARCH and TGARCH) models. Their outcome explained that a depreciation of the Indian Rupee leads to a drop in Indian stock market [23].

Abimbola and Olusegun (2017) investigated the relationship between exchange rate volatility, stock price movement and aggregate output in Nigeria using quarterly time series data from 1986 to 2015. The study was conducted through the application of ARCH and GARCH models and it concluded that the volatility exist in exchange rate and stock prices and they are found to affect the aggregate output negatively. The study further concluded that there exist a high degree at positive relationship between exchange rate, stock price movement and aggregate output [24].

Dayioglu and Aydin (2019) analysed the relationship between Borsa Istanbul index and a set of macroeconomic variables using Asymmetric GARCH models. The study captured the monthly data during the time frame of 2006-2018. The macroeconomic variables considered were industrial production, money supply, inflation rate, US dollar equivalent exchange rate and oil prices. The result revealed that the industrial production and exchange rate have a significant impact on the volatility of Istanbul stock market [25].

Although, several studies have been carried out on the effect of macroeconomic variables on stock market, only a few attempts have been made to examine the impact of selected macroeconomic factors (Inflation and interest rate) on the Indian securities market. This inspires us for investigating the impact on Indian stock market which would assist investors, politicians, central bankers and all interested stakeholders for a better understanding.

III. OBJECTIVES OF THE STUDY

The present research work tries

– To assess the effect of macroeconomic factors on the volatility of India's Nifty index returns by the application of ARCH and GARCH model.

– To assess the asymmetric effect of macroeconomic factors on India's Nifty index returns by application of EGARCH and TARCH model.

IV. DATA AND METHODOLOGY

A. Sources of Data

The secondary information has been considered for the study. Stock market returns of Nifty index of the National Stock Exchange (NSE), India is selected as the dependent variable and macroeconomic variables namely inflation and interest rate of India are considered as the independent variables. The research work comprises of monthly time series data of stock market returns and macroeconomic factors considering the time frame from January 2001 to December 2019. Monthly closing price index of Nifty are gathered from Money Control and macroeconomic variables are gathered from the Census and Economic Information Center (CEIC) Data.

B. Research Methods

Statistical tools namely Descriptive test, Augmented Dickey Fuller (ADF) test, Autoregressive Conditional Heteroscedasticity - Lagrange Multiplier (ARCH-LM) tests and GARCH class of models are used. The data has been analysed using E-views 11 package for better investigation.

C. Descriptive Statistics

To identify the statistical features of the monthly time series data of Nifty index returns, inflation and interest rate, the descriptive statistics is applied. The descriptive statistics expresses the patterns, movements and reviews the time series data on both securities market returns and macroeconomic factors in a significant manner.

D. Test for Stationarity

Unit root test is carried out to check if the data used in the present study are stationary or non-stationary. A time series data is believed to be stationary provided its mean as well as its variance are stable over time. A time series data is generally of non-stationary in nature that portrays an existence of unit root with a changing mean or variance or both. Hence, it is important to be certain that a stationary association is present amongst the variables. Augmented Dickey-Fuller (ADF) test established by Dickey and Fuller is employed for the purpose [26].

E. Test for Heteroscedasticity

ARCH-LM test is applied to inspect the residuals for the confirmation of heteroscedasticity. The variance of error terms is believed to be stable over time. In case, the error variance is unsteady, it is opined as heteroscedastic which was coined by Engle. This analysis is used to confirm the evidence of heteroscedasticity in residual of Nifty index returns and macroeconomic variables [8].

F. GARCH (1, 1)

The securities market and macroeconomic factors namely inflation and interest rate are interrelated. Variation in one macroeconomic variable leads to variation in another resulting in an overall variation in the economic condition of a nation. So, in order to investigate the fluctuation of macroeconomic factors and that of the securities market, the present study employs GARCH Model. The model coined by Bollerserv in 1986 arrests the volatility clustering and volatility symmetry blow in the equation of conditional variance [9].

The present study employs the GARCH (1, 1) model by using the following equations.

mean equation : $r_t = \mu + \varepsilon_t$ and

variance equation: $\sigma^2_t = \omega + \alpha\varepsilon^2_{t-1} + \beta\sigma^2_{t-1}$,

Here, r_t indicates return in period t, μ indicates average return and ε_t indicates residual return and $\omega>0$, $\alpha \geq 0$, $\beta \geq 0$. The α and β shows the variability in time series. When the sum of α and β is close to one, it reveals that a shock in period t will prolong further.

G. EGARCH (1, 1)

GARCH model doesn't arrest the asymmetry effect on the volatility of market returns. The tendency for instability to fall when the market returns boost and to enlarge when the market returns fall is expressed as the leverage effect [27]. EGARCH model arrests asymmetric reaction to the time varying volatility to rumours where volatility is always observed. Nelson in 1991 proposed this model to confirm the asymmetry result of share market instability [9].

The equation of E-GARCH (1, 1) can be expressed as:

$$\log(\sigma^2_t) = \omega + \beta_1 \log(\sigma^2_{t-1}) + \alpha_1 \left| \frac{\varepsilon_{t-1}}{\sigma^2_{t-1}} \right| + \gamma_1 \frac{\varepsilon_{t-1}}{\sigma^2_{t-1}}$$

In this model, α explains the ARCH effect which assesses the consequence of news regarding volatility from the earlier phase upon present phase volatility. β specifies the GARCH effect that estimates the persistence of the previous volatility. A positive β explains that positive movements in share price are interrelated with further affirmative changes and vice versa. γ evaluates the leverage/asymmetric effect. γ is likely to be less than zero which implies that awful news has more impact on instability than favourable news of the similar magnitude.

H. TARCH (1, 1)

The equation of the TARCH for the conditional variance can be expressed as:

$\sigma^2_t = \omega + \alpha\,\varepsilon^2_{t-1} + \gamma\, d_{t-1}\,\varepsilon^2_{t-1} + \beta\sigma^2_{t-1}$,

As per TGARCH model, α refers to ARCH term and β refers to GARCH term. Accordingly, good information ($\varepsilon_{t-1} > 0$) and the adverse information ($\varepsilon_{t-1} < 0$) have unlike results on the conditional variance. Favourable information has a blow on α, while awful information has a shock on $\alpha + \gamma$. Here, γ captures the asymmetrical effect of favourable news such as growth in inflation and unfavourable news such as increase in interest rate. Negative γ shows that favourable return shocks create less fluctuation than unfavourable shocks.

V. EMPIRICAL RESULTS

A. Descriptive Statistics

Nifty index returns, inflation in natural log and interest rate in natural log are considered to examine the fundamental statistical aspects of time series data. The Table 1 presents the descriptive statistical pattern of the data during the time span of 2001-2019. As shown in the table, means of Nifty index returns, inflation and interest rate are 1.176818, 1.775333 and 2.010615 respectively which establishes the fact that time series data has an upward trend over the period. Standard deviation which is the assessment of deviation from mean of Nifty index returns, inflation and interest rate are respectively 6.476244, 0.482429 and 0.134248. It is viewed that the Nifty index return is highly volatile compared to the inflation and interest rate as the standard deviation of index returns is highest. While deviation of interest rate from mean is comparatively low.

Table 1: Descriptive Statistics.

Parameters	Nifty Index Returns	Inflation	Interest Rate
Mean	1.176818	1.775333	2.010615
Maximum	28.06603	2.786012	2.329616
Minimum	-26.41028	0.079765	1.609438
Std. Dev.	6.476244	0.482429	0.134248
Skewness	-0.234353	-0.453779	-0.845284
Kurtosis	5.373792	3.318131	4.068271
Jarque-Bera	55.37452	8.747730	37.82601
Probability	0.000000	0.012602	0.000000
Observations	227	227	227

Nifty index returns and macroeconomic variables are negatively skewed which indicates that these variables have long left tails. Kurtosis values of the series are leptokurtic (> 3) presenting fat tail and do not show a normal distribution. This is further proved by Jarque-Bera test statistic which is a normality test to check the randomness of the series deemed for the study. Jarque-Bera test is statistically significant and therefore the null hypothesis of normality is eliminated. The descriptive

statistics specifies that the series are diverging from normal distribution and so there is no randomness in the variables and indicates the presence of heteroscedasticity.

B. Test for Stationarity

ADF test is performed to assess the stationary or non-stationary nature in time series data. Table 2 reflects the outcome of unit root test in the time series data applying ADF tests. The probability results of ADF test for all the three variables are below 0.05 which show that the information is stationary. So, the ADF test rejects the null hypothesis that there is a presence of a unit root in the data series in all three levels of significance. Therefore, the result of the tests validates that the series are stationary. The test confirms that all effects of the economic blows are wiped out and the time series data are ready for potential forecasting.

Table 2: ADF Unit Root Test.

Values	Nifty Index Returns	Inflation	Interest Rate
t-statistics	-14.15434	-2.984053	-2.964943
Prob.	0.0000	0.0379	0.0398
Critical Value			
1%	-3.459231	-3.459231	-3.459494
5%	-2.874143	-2.874143	-2.874258
10%	-2.573563	-2.573563	-2.573625

C. Test for Heteroscedasticity

The ARCH-LM test as portrayed in Table 3 indicates that the test statistics is significant. Since p-value is less than 0.05, the null hypothesis of 'no arch effect' is discarded at 1% level. This validates the existence of ARCH effects in the residuals of time series data in the returns. Therefore, ARCH-LM test specifies arch effect and warrant for the assessment of GARCH family models.

Table 3: Test for Heteroskedasticity

Heteroskedasticity Test: ARCH			
F-Statistics	12.82580	Prob. F	0.0004
Obs *R-squared	12.23702	Prob. Chi-Square	0.0005

D. GARCH (1, 1)

The outcome of basic GARCH model is presented in Table 4 with Nifty index return as the dependent variable and log of inflation and log of interest rate as dependent variables. It is examined to check whether macroeconomic factors have a blow on the share market of India by employing GARCH (1, 1) model.

The α and β of conditional variance equation are information coefficients. α being coefficient of previous information is statistically significant. This indicates that any recent information available in the market has a blow on the fluctuation in the index return. Thus, differences in market return are believed to have rooted by the advent of novel information of inflation and interest rate. At the same time, β coefficient of past information is also significant which reveals that past information effects the market return fluctuation. The addition of ARCH and GARCH coefficients i.e. α and β is 0.993, which is close to one reveals that fluctuation are continual in the securities market. Further, it can be opined that macroeconomic variable have GARCH effect in the Nifty index returns during the study period.

E. EGARCH (1, 1)

The EGARCH model is applied to arrest the asymmetric effect of fluctuation in securities market and the relationship between macroeconomic factors and securities returns. Table 5 portrays the assessment of the mean and variance equations from the model. In the conditional variance equation; the coefficient for last information C(5) i.e. α is statistically significant which infers that the latest news has a blow on the fluctuation on the index return. The persistence factor C(7) i.e. β is 0.998 and it is statistically significant. This confirms that the variance moves gradually. The coefficient of C(6) i.e. γ estimates the existence of asymmetry. The positive coefficient of γ indicates that the variance moves upward following positive residuals rather than following negative residuals. Positive and negative blows have unlikely effects on the index returns. Thus, favourable information will boost fluctuation of market returns to different extents.

Table 4: GARCH Model with Macroeconomic Variable and Stock Market.

Dependent Variable: Nifty Index Return				
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	11.28675	5.822222	1.938564	0.0526
Inflation	0.266829	1.047141	0.254817	0.7989
Interest Rate	-5.320731	3.282216	-1.621079	0.1050
	Variance Equation			
C (ω)	0.193023	0.549639	0.351182	0.7255
RESID(-1)^2 (α)	0.074374	0.030920	2.405347	0.0162
GARCH(-1) (β)	0.918433	0.038278	23.99374	0.0000

Table 5: EGARCH Model with Macro Economic Variable and Stock Market.

Dependent Variable: NIFTY_RETURN				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
LOG(GARCH) = C(4) + C(5)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(6)*RESID(-1)/@SQRT(GARCH(-1)) + C(7)*LOG(GARCH(-1))				
Variable	**Coefficient**	**Std. Error**	**z-Statistic**	**Prob.**
C	11.93570	6.078023	1.963748	0.0496
LOG(CPI)	0.167849	0.990875	0.169395	0.8655
LOG(IR)	-5.601960	3.353285	-1.670589	0.0948
	Variance Equation			
C(4) (ω)	-0.123604	0.059938	-2.062197	0.0392
C(5) (α)	0.155424	0.062832	2.473662	0.0134
C(6) (γ)	0.005196	0.035639	0.145807	0.8841
C(7) (β)	0.998833	0.016710	59.77594	0.0000

F. TARCH (1, 1)

TARCH model considers the leverage effect. Table 6 shows the existence of leverage effect which indicates that changes in share prices are reacting asymmetrically to the optimistic and pessimistic rumours in the market. β coefficient is significant that reflects that past data is persuading the instability in index return. γ Coefficient is positive which concludes that the blow in stock market is asymmetric. Awful news of macroeconomic variables persuades more fluctuation in market return than good news. Therefore, it can be concluded that macroeconomic variables are influencing the volatility in share market return.

Table 6: TARCH Model with Macroeconomic Variable and Stock Market.

Dependent Variable: NIFTY_RETURN				
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*RESID(-1)^2*(RESID(-1)<0) + C(7)*GARCH(-1)				
Variable	**Coefficient**	**Std. Error**	**z-Statistic**	**Prob.**
C	11.29342	5.849036	1.930817	0.0535
LOG(CPI)	0.265499	1.047262	0.253517	0.7999
LOG(IR)	-5.323755	3.288864	-1.618722	0.1055
	Variance Equation			
C(ω)	0.192751	0.557011	0.346045	0.7293
RESID(-1)^2(α)	0.073906	0.047906	1.542741	0.1229
RESID(-1)^2*(RESID(-1)<0) (γ)	0.000821	0.050845	0.016150	0.9871
GARCH(-1) (β)	0.918495	0.040685	22.57580	0.0000

VI. CONCLUSION

The present research effort tries to examine the effect of macroeconomic variables namely inflation and interest rate on volatility of Nifty index return using both symmetric and asymmetric GARCH models after testing the existence of ARCH effects. The findings of the present study have been in tune with other research works done so far [28, 29]. The findings ascertain the fact that there exists persistent volatility in the dependent variable i.e. Nifty index returns. Inflation and interest rate play a crucial role in the volatility of securities return. The results observe that volatility of inflation and interest rate has linkage with variations in Nifty index returns. The study concludes that the investment pattern as well as the firmness in the macroeconomic variables should be positive to ensure escalation in the Indian stock market.

VII. FUTURE SCOPE

This paper highlights the symmetric and asymmetric effect of macroeconomic factors on India's Nifty index returns. The present study focuses exclusively on the time series data of two macroeconomic factors of India, however the further studies can be carried out through considering similar macroeconomic factors. This research work would be more valuable if the study is extended to other indices as well.

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REFERENCES

[1]. Hamrita, M. E., Ben, A. N. & Ben, A. S. (2009). The Multi-Scale Interaction between Interest Rate, Exchange Rate and Stock Price, Exchange Rate and Stock Price. *Munich Personal RePEc Archive*, 1-11.

[2]. Adjasi, C., Harvey, S. K. and Agyapong, D. A. (2008). Effect of Exchange Rate Volatility on the Ghana Stock Exchange. *African Journal of Accounting, Economics, Finance and Banking Research*, *3*(3), 28-47.

[3]. Pilinkus, D. (2015). Stock Market and Macroeconomic Variables: Evidences from Lithuania. *Economics and Management*, *14*(1), 884-891.

[4]. Pal, K. & Mittal, R. (2011). Impact of Macroeconomic Indicators on Indian Capital Markets. *The Journal of Risk Finance*, *12*(2), 84-97.

[5]. Ray, D. S. (2012). Testing Granger Causal Relationship between Macroeconomic Variables and Stock Price Behaviour: Evidence from India. *Advances in Applied Economics and Finance*, *3*(1), 470-481.

[6]. Mandelbrot, B. (1963). The Variation of Certain Speculative Prices. *Journal of Business*, *36*(4), 394-419.

[7]. Fama, E., (1965). The Behaviour of Stock Market Prices. *Journal of Business*, *38*(1), 34-105.

[8]. Engle, R. F. (1982). Autoregressive Conditional Heteroscedasticity with Estimates of Variance of United Kingdom Inflation, *Econometrica, 50*(4), 987–1008.

[9]. Bollerslev, T. (1986). Generalized Autoregressive Conditional Heteroskedasticity. *Journal of Econometrics*, *31*(3), 307-327.

[10]. Nelson, D. B. (1991). Conditional Heteroskedasticity in Asset Returns: A New Approach. *Econometrica*, *59*(2): 347-370.

[11]. Zakoian, J. M. (1990). Threshold Heteroskedastic Model. *Journal of Economics Dynamics and Control*, *18*(5), 931- 955.

[12]. Glosten, L. R., Jagannathan, R., & Rukle, D. E. (1993). On the Relation between the Expected Value and Volatility of the Nominal Excess Return on Stocks. *Journal of Finance*, *48*, 1779-1801.

[13]. Fama, E. F., & French, K. R. (1989). Business Conditions and Expected Returns on Stocks and Bonds. *Journal of Financial Economics*, *25*(1), 23-49.

[14]. Ferson, W. E., & Harvey, C. R. (1991). The Variation of Economic Risk Premiums. *Journal of Political Economy*, *99*(2), 385-415.

[15]. Lee, B. S. (1992). Causal Relations among Stock Returns, Interest Rates, Real Activity, and Inflation. *The Journal of Finance*, *47*(4), 1591-1603.

[16]. Fama, E. F. (1991). Efficient capital markets: II. *The Journal of Finance*, *46*(5), 1575-1617.

[17]. Mansor, I. (1999). Macroeconomic Variables and Stock Prices in Malaysia: An Empirical Analysis. *Asian Economic Journal*, *13*(2), 219-231.

[18]. Niarchos, N., & Alexakis, C. (2000). Market Trend, Company Size and Microstructure Characteristics of Intraday Stock Price. *European Research Studies*, *6*(1-2), 73-89.

[19]. Wongbangpo, P., & Sharma, S. C. (2002). Stock Market and Macroeconomic Fundamental Dynamic

Interactions: ASEAN-5 Countries. *Journal of Asian Economics, Elsevier*, *13*(1), 27-51.
[20]. Mala, R., & Reddy, M. (2007). Measuring stock market volatility in an emerging economy. *International Research Journal of Finance and Economics, 8*, 126-134.
[21]. Rad, A. A. (2011). Macroeconomic Variables and Stock Market: Evidence from Iran. *International Journal of Economics and Finance Studies*, *3*(1), 1-10.
[22]. Hosseini, S. M., Ahmad, Z., & Lai, Y. W. (2011). The Role of Macroeconomic Variables on Stock Market Index in China and India. *International Journal of Economics and Finance*, *3*(6), 233-243.
[23]. Anshul, J. & Biswal, P. C. (2016). Dynamic Linkages among Oil Price, Gold Price, Exchange Rate and Stock Market in India. Resources Policy, *49,* 179–185.
[24]. Abimbola, A. B., & Olusegun, A. J. (2017). Appraising the Exchange Rate Volatility, Stock Market Performance and Aggregate Output Nexus in Nigeria. *Business and Economics Journal*, *8*(1), 1-12.
[25]. Dayıoglu, T., & Aydın, Y. (2019). Relationship between the Volatility of Stock Returns and the Volatility of Macroeconomic Variables: A Case of Turkey. *American Journal of Theoretical and Applied Business*, *5*(2), 40-46
[26]. Dickey, D. A., & Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of American Statistical Association, 74*(366), 427–31.
[27]. Enders, W. (2004). Applied Econometric Time Series. *Walter Technometrics*.
[28]. Sokpo, J. T., Iorember, P. T., & Usar, T. (2017). Inflation and Stock Market Returns Volatility: Evidence from the Nigerian Stock Exchange 1995Q1-2016Q4: An E-GARCH Approach. *International Journal of Econometrics and Financial Management*, *5*(2), 69-76.
[29]. Tripathy, N. (2011). Forecasting Volatility of Indian Stock Market and Macro Economic Variables. *International Journal of Arts & Sciences*, *4*(9), 225–238.

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