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Investor Sentiment and Stock Volatility: Evidence from the Nigerian Exchange Limited (NGX)

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Market fundamentals' role in financial assets valuation cannot be denied. However, the volatility in asset prices often causes them to deviate from their intrinsic value due to irrational behaviour of certain investors, indicating that fundamentals alone are insufficient for asset valuation. This motivated this study to examine how direct and indirect investor sentiment affects stock price volatility of quoted companies on the Nigerian Exchange Limited (NGX) from January 2014 to December 2021. Data were obtained from the CBN Consumer Expectation Survey Report and the Security and Exchange Commission Statistical Bulletin, respectively. The study employed GARCH (1,1) as the estimation technique. The findings showed that direct investor sentiment with ($\beta = 0.00049$, p-value = 0.001) has positive significant impact on stock volatility, while indirect investors' sentiment has negative significant impact ($\beta = -0.0066$, p-value: 0.000). These findings suggest that optimistic sentiment from irrational traders leads to higher volatility, while pessimistic sentiment results in lower volatility. In addition, the study found evidence of volatility clustering in stock prices on the NGX attributed to investor sentiment. In conclusion, the study highlights the critical role of both direct and indirect investor sentiment as a systematic factor influencing stock volatility in Nigeria. As a result, it recommends considering investors' sentiment as a risk factor in addition to fundamental factors when making investment decision, and advises quoted firms to improve on investor communication strategies, ensuring timely and accurate information is shared to reduce uncertainty and irrational market reactions.

1. Introduction

Over the years, the continuous increase in market anomalies and stock market crashes has posed significant challenges to traditional finance (Li & Liu, 2020). Previous research indicates that the psychological and behavioral biases of investors, along with their limited responsiveness to information, can activate investor sentiment. Consequently, this sentiment leads to heightened market volatility, reduced market efficiency, and prolonged deviations of prices from their intrinsic value (Latif, Shunqi, Bashir, Iqbal, Ali, & Ramzan, 2021).

Traditional finance theories, such as the efficient market hypothesis (EMH) and random walk theory, have historically overlooked the influence of investor sentiment as a crucial factor. As a result, they have failed to explain the diverse behavior of investors, disregarding the heterogeneous nature of the capital market contrary to the homogeneous assumption of the EMH. Investor sentiment holds significant importance in the stock market, as it frequently causes fluctuations in stock prices and introduces uncertainty regarding expected investment returns in financial assets. Moreover, traditional finance theories do not account for the systematic mispricing caused by the impact of sentiment in stock markets (Haritha & Rishad, 2020).

Behavioral finance theories question the idea of investor rationality and propose that irrational behavior can cause asset prices to deviate from their intrinsic values. Recent advancements in both theoretical and empirical research in behavioral finance have challenged the assumptions of traditional finance theories, particularly the notion of market efficiency. During periods characterized by high investor sentiment, mispricing arises due to the prevalence of irrational traders, resulting in elevated market volatility. Devault, Sias, and Starks (2019) discovered that irrational traders tend to gravitate towards more speculative stocks as sentiment intensifies. This collective behavior among sentiment-driven traders leads to rapid increases in trading volumes and ultimately contributes to heightened market volatility (El-Gayar, El-Hayes, & Metawa, 2021; Zi-long, Su-sheng & Ming-zhu, 2021).

The increasing presence of irrational traders in the market gives rise to mispricing, which creates a profitable opportunity for rational arbitrageurs to exploit. However, the ability of rational traders to take advantage of this mispricing is hindered by various constraints, including noise trader risk and limitations on arbitrage such as short-selling constraints. As a result, pricing bubbles emerge as a result of the combined effects of overvaluation caused by sentiment traders who undervalue risk and the absence of arbitrage activities by rational traders (Haritha & Rishad, 2020). These bubbles eventually burst when sentiment and expectations reverse, leading to a mass liquidation of portfolios by irrational traders. This bursting process of bubbles induces volatility in stock markets, amplifying price fluctuations and asset values (Dai, 2020).

Stock volatility refers to the fluctuation of stock market prices around their averages, encompassing both upward and downward movements. It reflects the degree of uncertainty or the magnitude of deviations in share prices. Volatility can be measured using standard deviation or variance, which analyze the returns of the same stock price or market index (Nageri, 2019). Volatility serves as a metric for investment risk, and could otherwise be computed as the logarithm of the daily proportion of high and low stock prices for each stock. While high volatility is generally viewed unfavorably, the market prefers a moderate level of volatility to encourage investment activities.

The occurrence of stock market volatility is often triggered by the influx of new information or changes in market prices, resulting from the reactions of market participants to this information. According to the efficient market hypothesis, unexpected fluctuations in asset prices stem from significant shifts in macroeconomic fundamentals. Consequently, macroeconomic factors can serve as a source of systematic risk and contribute to market volatility (Ali, 2019; Nageri, 2019).

Furthermore, within the financial literature, there is a widespread consensus regarding the significant impact of stock volatility on the well-being of the economy (Ali, 2019). Consequently, comprehending stock volatility is crucial for market participants as it enables informed asset allocation decisions, facilitates the determination of capital costs, aids in assessing fluctuations in expected returns, and evaluates associated investment risks. The nature of stock volatility finds practical applications in diverse areas such as investment portfolio management, option pricing, risk management, and financial market regulation. However, excessive volatility or noise in the stock market undermines the reliability of stock prices as reliable indicators of a firm's true intrinsic value, thereby challenging the assumption of market informational efficiency (Nageri & Abdulkadir, 2019).

In the face of volatile turbulent conditions, attaining the desired level of effectiveness becomes arduous. Volatility, synonymous with risk and uncertainty, adversely affects investors and results in increased capital costs. Moreover, heightened market volatility fuels speculative investments, exacerbating issues within the market from a social investment perspective. Therefore, persistent volatility indicates a predictable alteration in the risk and return tradeoff throughout the business cycle, allowing for the prediction of future economic variables in countries where stock markets are well-developed (Ali, 2019; Nageri, 2019).

Furthermore, stock volatility in the short term is influenced by various factors. Notably, when a large number of individuals engage in trading in the same direction, whether buying or selling, it leads to market volatility. Additionally, the introduction of new information, whether positive or negative, tends to influence investor perception regarding the appropriateness of current prices. Consequently, if investors perceive prices as excessively high, they swiftly initiate selling their holdings. In the absence of corresponding buying interest from other investors, prices experience a significant decline, resulting in short-term volatility in returns.

Furthermore, investor sentiment regarding the sustainability of ongoing price movements plays a role in shaping future fluctuations in share prices. For instance, when prices begin to decline and investors anticipate a continued downward trend, they become inclined to sell their shares. In the absence of prospective buyers seeking undervalued shares, prices undergo a sharp descent (Latif, Shunqi, Bashir, Iqbal, Ali, & Ramzan, 2021).

Therefore, obtaining a clear understanding of the level of stock volatility observed in the stock market is of paramount importance for market regulators. High volatility has the potential to trigger investor panic, leading to a loss of confidence in the market and increased transaction costs. Hence, comprehending the relationship between changes in investor sentiment and stock volatility holds significant value for both investors, aiding them in making well-informed investment decisions, and policymakers, enabling them to effectively regulate the stock market while evaluating its vulnerability (Yang & Chi, 2020). From the foregoing, this study aims to address the extent to which investor sentiment influence stock volatility on the NGX with a specific objective is to examine the impact of investor sentiment on stock volatility on the NGX.

Scholars have extensively studied how investor emotions influence stock prices, especially in rich countries. Concentto and Ravazzolo (2019) found that investor feeling is capable of inducing price fluctuations in financial assets which in turn would either boost or reduce profits. This is because emotions can make prices move away from their real value, increasing risk. When investors feel too confident about the future, they may trade carelessly, buy more stocks, and push prices higher. As a result, strong positive feelings often make stock prices rise later, while negative feelings make them fall. Hence, sentiment of investors is responsible for excessive upward and downward movement in prices of financial assets in the market (Lekovic, 2019).

The relationship between sentiment-driven trading and stock volatility carries significant implications for participants in financial markets. Asset pricing models primarily focus on fundamental factors when assessing risk determinants. However, the increased volatility resulting from sentiment-driven trading can introduce changes in risk that cannot be explained by fluctuations in fundamental variables alone. As a result, the risk associated with financial assets may surpass the thresholds suggested by asset pricing models based on rationality. Therefore, it is crucial to establish a link between investor sentiment and stock volatility in Nigeria, as this would provide valuable insights for investors and policymakers. Precise measurement and evaluation of risk are vital components of price discovery, risk management, and portfolio management in financial markets, relying on the abilities of market participants to accurately assess and evaluate risk factors.

Therefore, it is of utmost importance for this study to investigate whether investor sentiment has varying effects on stock volatility on the NGX, addressing the geographical gap identified in the literature. By doing so, this study aims to make a significant contribution to the current body of knowledge, while also benefiting institutional and individual investors, portfolio managers, and policymakers. The findings of this study will offer valuable evidence concerning the influence of investor sentiment on stock volatility, particularly on the Nigerian Exchange Limited.

2. Research Method

The sample taken for this study comprises of twenty (20) companies whose market capitalizations accounted for over 85% of the total market capitalisation of the NGX as at December 2021. The model used for this study was based on the GARCH (1,1) model as adapted in the studies of Haritha and Rishad (2020) and Rupande, Muguto and Muzindutsi (2019). The GARCH (1,1) model helps to analyze the volatility characteristics of financial data by identifying patterns of price fluctuations and instability.

However, this study is different from previous ones because it includes both direct and indirect ways to measure investor sentiment, like the investor confidence index and a market-based index. To achieve this, the basic GARCH model was adjusted to include these sentiment indicators. The reason for the modification was because this study focused strictly on assessing sentiment-induced volatility on the NGX. The model can be expressed as follows:

$$Y_t = \alpha_0 + \beta_0 Y_{(t-1)} + [\beta_1 Dsent]_{(t-1)} + [\beta_2 Isent]_{(t-1)} + u_t$$

.....1

$$\sigma_t^2 = \omega_0 + \sum_{(i=1)}^p [\alpha_i \varepsilon_{(t-i)}^2] + \sum_{(j=1)}^q [\beta_j \sigma_{(t-j)}^2] + \beta_1 [DSENT]_{(t-1)} + \beta_2 [ISENT]_{(t-1)}$$

..... 2

the mean equation comprising an error term, while equation (2) represents the conditional variance, which is expressed as a function of three components: the constant ω , ε_{t-1}^2 denoted as the ARCH term captures the volatility from the previous period and is measured as the lag of the squared residual from the mean equation. σ_{t-1}^2 represents the GARCH term, which represents the forecast variance from the previous period. In the equations, Y_t represents volatility index, Y_{t-1} signifies the lagged values of index risk-adjusted volatility, and $DSENT_{t-1}$ and $ISENT_{t-1}$ represent the lagged direct and indirect investors' sentiment indexes, respectively. β_0 represents the model's coefficient. α_i represents the coefficients of the lagged squared residuals, and β_j signifies the coefficients of the lagged conditional variance. The coefficients to be estimated are α , and β , subject to the conditions $\omega > 0$, $\alpha \geq 0$, $\beta \geq 0$, $\alpha_i + \beta_j < 1$.

Due to the lack of a universally accepted measure of investor sentiment, this study employed principal component analysis (PCA) to construct an indirect sentiment composite index. The index was created using five stock market-specific indicators, namely closed-end fund, volume of trade, turnover ratio, equity share in new issues, and dividend yield. The selection of these proxies was based on data availability. PCA was used to reduce the complexity and size of the data while keeping important details intact. It also facilitates the reduction of dataset dimensionality, enhancing interpretability without sacrificing information integrity. The composite index was formed by taking the first key component from the correlation matrix of the factors. For each factor, its current or lagged value is considered, depending on which one exhibits a stronger correlation with the initial index. Thus, this method produces a straightforward sentiment index:

$$[Sent]_t = \theta_1 [CEF]_{t-1} + \theta_2 [CEF]_t + \theta_3 [VOT]_{t-1} + \theta_4 [VOT]_t + \theta_5 [TUR]_{t-1} + \theta_6 [TUR]_t + \theta_7 [NEQ]_{t-1} + \theta_8 [NEQ]_t + \theta_9 [DIY]_{t-1} + \theta_{10} [DIY]_t$$

Where: CEF is closed-end fund, VOL is the volume of trade, TUR is the turnover ratio, NEQ is the new equity issue, DIY is the dividend yield and θ symbolizes the factor loadings on the first principal components of the lagged and contemporaneous proxies.

The study uses monthly balanced panel data covering the period 2014-2020. The data for consumer confidence index was obtained from the CBN Consumer Expectations Survey Report. While market-specific data are obtained from the Security and Exchange Commission Statistical Bulletin. The period (2014-2020) was chosen due to data availability.

3. Result and Discussion

Table 1

Descriptive statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
VOL	-0.01024	0.06313	4.9273	0.16
DSENT	-2.01833	4.217838	-9.933333	9.4
ISENT	-1.60e-08	1.000001	-0.02565	51.80438

Source: Authors

From Table 1, the average value of stock volatility is slightly negative. On average, both the direct and indirect sentiment indicator is negative, suggesting overall pessimism, even though indirect sentiment indicator is centered around zero.

Table 2

Augmented Dickey-Fuller (ADF) Unit Root Test

H0: Variables has a Unit Root/Non-stationery

Variables	First Difference	
	t-stat	Status
VOL	-3.845*	I(1)
<i>p-value</i>	0.0099	
DSENT	-3.980*	I(1)
<i>p-value</i>	0.04166	
ISENT	-3.167*	I(1)
<i>p-value</i>	0.0333	

Source: Authors

Table 2 shows the results of Augmented Dickey-Fuller unit root test. It indicates that stock volatility, direct investors' sentiment and indirect investors' sentiment were non-stationary at their original levels but became stationary after taking the first difference I(1).

Table 3

Cumulative proportion of sentiment proxies

Component	Eigenvalue	Difference	Proportion	Cumulative Eigenvalue	Cumulative Proportion
CEF	2.12144	0.786775	0.4243	2.1214	0.4243
VOT	1.33466	0.630617	0.2669	3.4561	0.6912
TUR	0.704044	0.1701	0.1408	4.1601	0.8320
ESN	0.533944	0.228029	0.1068	4.6940	0.9388
DIY	0.305915	-	0.0612	5.0000	1.0000

Source: Authors

From Table 3, the resultant composite sentiment index obtained through principal component analysis exhibits several desirable characteristics. Firstly, all five proxies exhibit the anticipated signs, with some decreasing when sentiment is low, and others increasing when sentiment is high. Moreover, all variables are included at the right time, accurately reflecting shifts in investor sentiment.

Table 4

Estimated GARCH Model

Parameters	Coefficient	t-statistic	p-value
ω	0.1975575	323.15	0.000
DSENT	0.0004881	3.41	0.001
ISENT	-0.0065751	-15.99	0.000
ARCH (α)	0.1862152	19.76	0.000
GARCH(β)	0.8136606	157.62	0.000
$\alpha_i + \beta_j$	0.9998758	177.38	0.000

Source: Authors

The GARCH (1,1) model's results, presented in Table 4, demonstrate the effects of direct investors' sentiment (DSENT) and indirect investors' sentiment (ISENT) on stock volatility on the NGX. The mean equation's findings reveal significant impacts of both DSENT and ISENT on stock volatility.

Specifically, DSENT is found to have a positive and significant impact on stock volatility. This implies that bullish sentiment arising from irrational trading leads to increased volatility in the stock market. When investors exhibit optimistic beliefs and engage in irrational trading behaviours, it contributes to higher stock market volatility. Conversely, ISENT has a negative and significant impact on stock volatility. This indicates that bearish sentiment resulting from irrational trading activities actually decreases volatility in the stock market. When investors exhibit pessimistic outlooks and engage in irrational trading behaviours, it leads to lower stock market volatility.

The statistical significance of both direct and indirect investors' sentiment suggests that investors' sentiment plays a role in inducing stock volatility on the NGX. This means that past psychological beliefs held by investors influence the persistence of current stock volatility. Thus, if investors maintain a pessimistic outlook for future markets, this sentiment tends to persist over an extended period of time.

One the other hand, evidence from the conditional variance analysis revealed important insights into stock price movements on the NGX. The ARCH (α) and GARCH (β) values are positive, important, and not zero. Moreover, $\alpha + \beta$ is equal to one, indicating a high level of volatility persistence. This implies that stock volatility in the previous periods affects the current period's volatility. Similarly, the positive significant coefficient of GARCH parameter (β) confirms that when stock prices fluctuate a lot, they continue to do so, and when they are stable, they remain stable. The persistence parameter ($\alpha + \beta$) being close to unity further reinforces the evidence of volatility persistence in stock returns on the NGX.

Importantly, all the parameters in the model are statistically significant, indicating their effectiveness in explaining the current stock volatility. The shocks generated by direct and indirect investor sentiment, represented by the parameter α , along with the volatility in the previous period captured by the parameter β , and changes in investor sentiment collectively contribute to explaining the volatility of stock return on the NGX. The impact of previous period volatility, as captured by the β parameter, is particularly significant, suggesting its prominent role in determining the current volatility level. Additionally, while the sentiment volatility is found to be stationary, the combined effect of α and β being close to one indicates a high degree of volatility persistence. This implies that a shock in the current volatility will have a lasting influence on the expectation of volatility over multiple future periods.

4. Conclusion

These findings of the study contribute to the understanding of the relationship between investor sentiment and stock volatility on the NGX, highlighting the importance of considering behavioural factors in addition to market fundamentals. Likewise, the significant role of unexpected shocks generated by investor sentiment and the persistence of past volatility in explaining the volatility of stock return on the NGX was highlighted.

Hence, direct and indirect investors' sentiment explain stock volatility and should be taken as a systematic factor which plays a critical role in predicting stock volatility on the NGX. Thus, in order to deal with some of the debatable assumptions of the classical financial theories such as investors' rationality and market efficiency, the modern asset pricing theories should be extended to incorporate behavioural indicators in their models to explain the existence of investor sentiment in the financial systems. Finally, the study recommends that: given the persistence of volatility, investors should adopt risk management strategies such as diversification and hedging to protect their portfolios from prolonged market fluctuations; policymakers and regulators such as SEC and CBN should implement policies that minimize extreme fluctuations in investor confidence to stabilize market conditions and improve investment attractiveness; and quoted firms should improve investor communication strategies, ensuring timely and accurate information is shared to reduce uncertainty and irrational market reactions.

5. References

- Abdelmalek, W. (2021). Investor sentiment, realized volatility and stock returns. *Rev Behav Financ*. <https://doi.org/10.1108/RBF-12-2020-0301>
- Akinmade, B., Adedoyin, F.F., & Bekun, F.V. (2020). The impact of stock market manipulation on Nigeria's economic performance. *Journal of Economic Structures*, 9(1).
- Al-Awadhi AM, Alsaif K, Al-Awadhi A, Alhammadi S (2020) Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. *J Behav Exp Financ* 27:100326
- Ali, P.I. (2019). Analysing existence of volatility persistence in Sub-Sahara African stock markets. *AFRE Accounting and Financial Review*, 2(1), 1-7,
- Baker, S.R., Bloom, N., Davis, S.J., Kost, K.J., Sammon, M.C., & Viratyosin, T. (2020). The unprecedented stock market impact of COVID-19 (No. w26945). National Bureau of Economic Research. Retrieved from <https://www.nber.org/papers/w26945>.
- Behrendt, S.& Schmidt, A. (2018). The twitter myth revisited: Intraday investor sentiment, twitter activity and individual-level stock return volatility. *Journal of Banking & Finance*, 96, 355–367.
- Bibiana, O.N., Jaiyeoba, A.O. & Oladotun, M. (2020). Investors' sentiment and stock trading in the Nigerian capital market. *Caleb International Journal of Development Studies*, 3(2), 235-247.
- CBN (2020). Consumer Expectations Survey Report: A Quarterly Publication. Second Quarter.

- Cevik, E., Altinkeski, B.K., Cevik, E.I. & Dibooglu, S. (2022). Investor sentiments and stock markets during the COVID-19 pandemic. *Financial Innovation*, 8(69), 1-34.
- Chen, Y., Zhao, H., Li, Z. & Lu, J. (2020). A dynamic analysis of the relationship between investor sentiment and stock market realized volatility: Evidence from China. *PLoS ONE* 15(12):e0243080.
- Concetto, C.L., & Ravazzolo, F. (2019). Optimism in financial markets: stock market returns and investor sentiments. *J. Risk Financial Manag.* 12, (85), 1-14.
- Corbet, S., Larkin, C. & Lucey, B. (2020). The contagion effects of the COVID-19 pandemic: Evidence from gold and cryptocurrencies. *Financ Res Lett*, 35, 101554.
- Dai, J. (2020). Investor sentiment and mispricing anomalies. *International Journal of Economics, Business, and Entrepreneurship*, 3(1), 29-36.
- Devault, L., Sias, R., & Starks, L. (2019). Sentiment metrics and investor demand. *Journal of Finance*, 74(2), 985–1024.
- Economou, F., Hassapis, C., & Philippas, N. (2018). Investors' fear and herding in the stock market. *Applied Economics*, 50(34), 3654–3663.
- El-Gayar, A.H., El-Hayes, I.A., & Metawa, S. (2021). The impact of investor sentiment on stock market liquidity: The mediating role of investor herding behavior: An empirical study on the Egyptian stock exchange. *American Journal of Business and Operations Research (AJBOR)*, 5(1), 31-60.
- Ertas F.C. & Özkan, O. 2018. Piyasa Etkinligi Açısından Adaptif Piyasa Hipotezi'nin Test Edilmesi: Türkiye ve ABD Hisse Senedi Piyasaları Örneği. *Finans Politik ve Ekonomik Yorumlar*, 642, 23-40.
- Gao, Y., Zhao, C., Sun, B. & Zhao, W. (2022). Effects of investor sentiment on stock volatility: New evidences from multi-source data in China's green stock markets. *Financial Innovation*, 8(77), 1-30.
- Gui, J., Pu, J., Naktnasukanjn, N. Yu, X., Mu, L. & Pan, H. (2022). Measuring investor sentiment of China's growth enterprises market. *Procedia Computer Science*, 202(2022), 1–8.
- Gunay, S. (2020). A new form of financial contagion: COVID-19 and stock market responses. <http://dx.doi.org/10.2139/ssrn.3584243>
- Haritha P. & Rishad, A. (2020). An empirical examination of investor sentiment and stock market volatility: Evidence from India. *Financial Innovation*, 6(34), 1-15.
- Hu, J., Sui, Y. & Ma, F. (2021). The measurement method of investor sentiment and its relationship with stock market. *Computational Intelligence and Neuroscience*, (21).
- Jiang, S. & Jin, X. (2021). Effects of investor sentiment on stock return volatility: A spatio-temporal dynamic panel model. *Econ Model*, 97, 298–306.
- Latif, Y., Shunqi, G., Bashir, S., Iqbal, W., Ali, S., & Ramzan, M. (2021). COVID-19 and stock exchange return variation: Empirical evidences from econometric estimation. *Environmental Science and Pollution Research* (28), 60019–60031.

- Lekovic, M. (2019). Behavioral portfolio theory and behavioral asset pricing model as an alternative to standard finance concepts. *Economic Horizons*, 21(3), 255-271.
- Li, W. & Liu, W. (2020). Investor sentiment-styled index in index futures market. *Rev Financ Econ*. 1–22. 10.1002/rfe.1102
- Liu, W., Zhang, C., & Qiao, G. (2022). Impact of network investor sentiment and news arrival on jumps. *Econ Financ*, 62, 101780.
- Liu, X., Han, B. & Li, L. (2022). Impact of investor sentiment on portfolio. *Emerging Markets Finance and Trade*, DOI: 10.1080/1540496X.2022.2119805
- Lo, A. (2004). The adaptive market hypothesis: Market efficiency from an evolutionary perspective. *The Journal of Portfolio Management*, 30(5), 15–29.
- Nageri, K.I. & Abdulkadir, R.I. (2019). Is the Nigerian stock market efficient? Pre and post 2007-2009 meltdown analysis. *Studia Universitatis "Vasile Goldis" Arad. Economics Series*, 29(3), 38-63.
- Nageri, K.I. (2019). Evaluating volatility persistence of stock returns in the pre and post 2008-2009 financial meltdown. *Copernican Journal of Finance & Accounting*, 8(3), 73–91.
- Onali, E. (2020). Covid-19 and stock market volatility, Available at SSRN 3571453.
- Papadamou, S., Fassas, A., Kenourgios, D. & Dimitriou, D. (2020). Direct and indirect effects of COVID-19 pandemic on implied stock market volatility: Evidence from panel data analysis. MPRA Paper No. 100020. <https://mpra.ub.uni-muenchen.de/100020/>
- Phan, T.N.T., Bertrand, Phan, H.H. & Vo, X.V. (2021). The role of investor behavior in emerging stock markets: Evidence from Vietnam. *The Quarterly Review of Economics and Finance*, 1-10.
- Rawat, D. Patni, S. & Mehta, R. (2021). Stock prices and macroeconomic indicators: Investigating a correlation in Indian context. *Birla Institute of Technology and Science, Pilani Campus Pilani, Rajasthan*, 1-22.
- Rupande, L., Muguto, H.T. & Muzindutsi, P.F. (2019). Investor sentiment and stock return volatility: Evidence from the Johannesburg Stock Exchange. *Cogent Economics & Finance*, 7(1).
- Sakariyahu, R., Sherif, M., Paterson, A., & Chatzivgeri, E. (2020). Sentiment-apt investors and UK sector returns. *Int J Fin Econ*.1(31), 1-31.
- Schneller, D., Heiden, S., Hamid, A., & Heiden, M. (2018). Home is where you know your volatility–local investor sentiment and stock market volatility. *German Economic Review*, 19(2), 209–236.
- Seok, S.I., Cho, H., & Ryu, D. (2018). Firm-specific investor sentiment and the stock market response to earnings news. *The North American Journal of Economics and Finance*, 48, 221–240.
- Sharma, S.S. (2020). A note on the Asian market volatility during the COVID-19 pandemic. *Asian Econ Lett*, 1(2),17661.

- Shen, J., Yu, J., & Zhao, S. (2017). Investor sentiment and economic forces. *Journal of Monetary Economics*, 86, 1–21
- Yang, C. & Chi, J. (2020). Investor sentiment and volatility of exchange-traded funds: Evidence from China. *Int J Fin Econ*, 1–13.
- Yang, C., & Wu, H. (2019). Investor sentiment with information shock in the stock market. *Emerging Markets Finance and Trade*, 1–15.
- Zaremba, A., Kizys, R., Aharon, D.Y. & Demir, E. (2020). Infected markets: Novel corona virus, government interventions, and stock return volatility around the globe. *Financ Res Lett*, 35, 101597.
- Zhang, D., Hu, M., & Ji, Q. (2020). Financial markets under the global pandemic of COVID-19. *Finance Research Letters*, 36, 101528. doi: <https://doi.org/10.1016/j.frl.2020.101528>
- Zi-long, L., Su-sheng, W. & Ming-zhu, H. (2021). International investor sentiment and stock returns: Evidence from China. *Investment Analysts Journal*, 50(1), 60–76.