BRICS JOURNAL OF ECONOMICS
DOI 10.3897/brics-econ.6.e142917
2025 Volume 6 Number 1

Stock Markets Returns and Interactive Effects of Economic Policy Uncertainty and Exchange Rate Volatility: Evidence from MENA Markets

David Umoru[1], Enike Imran Abu[1], Beauty Igbinovia[1], Georgina Asemota[2], Ahinkweokhai Igbafe[3], Henry Imogiemhe Idogun[4]

1 *Department of Economics, Edo State University Uzairue, Iyamho, Nigeria* **2** *Department of Economics, Banking & Finance, Benson Idahosa University, Benin City, Nigeria* **3** *Department of Cooperative Economics, Auchi Polytechnic, Auchi, Nigeria* **4** *Department of Economics, Ambrose Alli University, Ekpoma, Nigeria*

Corresponding author: David Umoru (david.umoru@yahoo.com/david.umoru@edouniversity.edu.ng)

Academic editor: Kapoguzov E. | Received 27 November 2024 | Accepted 20 January 2025 | Published 2 April 2025

Citation: Umoru, D., Abu, E. I., Igbinovia, B., Asemota, G., Igbafe, A., Idogun, H. I. (2025). Stock Markets Returns and Interactive Effects of Economic Policy Uncertainty and Exchange Rate Volatility: Evidence from MENA Markets. *BRICS Journal of Economics, 6*(1), 91–117. https://doi.org/10.3897/brics-econ.6.e142917

Abstract

This research aims to investigate the influence of stock market volatility and liquidity turnover on returns in the emerging markets of Middle East and North Africa (MENA countries) using the interaction of global economic policy uncertainty index and exchange rate as a moderating variable. The paper employs panel quantile regression with daily data from January 1, 2000 to August 30, 2024 and a panel quantile regression sensitivity analysis. The findings suggest that the U.S. economic policy uncertainty index was markedly negative; the negative and significant interaction coefficient between the variables of exchange rate fluctuations and worldwide economic policy uncertainty indicates that stock returns of the MENA markets dropped substantially in response to international economic policy uncertainty; the more extensively the exchange rate fluctuated, the lower were the returns. Empirical evidence reveals shifting dynamics in the impact of short-term interest rate volatility on returns as we move from the period before the pandemic outbreak to the post-pandemic era. The study has notable implications for financial investors. Markets' response to interest rate volatility cannot be predicted with high degree of certainty because the market reacts spontaneously to adjustments in the short-term interest rate even when market players operate rationally and base their decisions on all available information regarding stock prices. As a result, investors may choose to consider selecting shorter-life alternative equities as a long-term hedge against interest rate volatility risk. The MENA countries' central monetary authorities and governments should work jointly to maintain stock market stability by enacting measures to make stock exchanges and the equity markets more resilient to the negative effects of uncertainty brought on by foreign economic policy, even as exchange rate volatility rises. Additionally, international business entities and traders could also shield themselves against international economic policy-related risk of uncertainty in the midst of currency volatility given the current research.

Keywords
Short-term interest rate differential, liquidity turnover, before and after outbreak of pandemic, sensitivity analysis

JEL: A22, B30 C40.

1. Introduction

Economic policy uncertainty (EPU) has been identified as a significant global risk indicator that can have a negative impact on global financial markets ever since the terrorist attacks on the US in 2001, global financial crisis of 2008, European immigration crisis in 2015, and European debt crisis threatened the stability of the global financial system (Barak & Ünlü, 2024; Moudud-Ul-Huq & Akter, 2024; Desalegn & Zhu, 2021; Davis, 2016). It can endanger international investors and multinational corporations whose investment interest is in the emerging markets of Middle East and North Africa (MENA). Zeng *et al.* (2024) contend that EPU has a major impact on the perceptions and preferences of stock market investors including those of the MENA countries. The MENA region is a highly dynamic region, driving investment opportunities both regionally and across the globe. Today it seeks to develop its capital markets to ensure the ease of access to the opportunities available. The securities sector in the MENA region has substantially improved its performance over the recent years thanks to stronger local financial institutions, greater presence of regional asset managers and increased interest from foreign investors. There are over twenty stock markets in the MENA countries; we consider ten of them, specifically Abu Dhabi Securities Exchange (UAE), Saudi Exchange, Iraq Stock Exchange, Amman Stock Exchange, Iraq Stock Exchange, Tehran Stock Exchange, Kuwait Stock Exchange, Muscat Securities Market, Doha Securities Market and Borsa Istanbul, as these have so far been neglected by other researchers in the area of stock market analysis.

The stock market offers a platform for traders and investors to communicate, do business, and possibly make a profit. By offering bonds and stock to investors, it gives corporations the capital they require. Investors in turn gain from the profitable performance of companies by receiving dividends and also because of capital appreciation. A strong gauge of the economy's condition is the stock market capitalization. Robust capitalization of the stock market assures buyers and sellers of a level playing field in a country's market. The financial market is part of the global economy, according to Mashilal *et al.* (2024). Consequently, the stock market of a given nation is prone to be impacted by the EPU of another country or group of countries.

Without taking account of exchange rate fluctuations, researchers like Odionye *et al.* (2024) have assessed the effect of economic policy uncertainty on stock market returns. Durmaz (2024) also recalculated the impact of policy uncertainty on stock prices, while Umar-Farouk *et al.* (2024) examined the relationship between stock returns and exchange rates in African emerging and frontier markets without assessment of the moderating influence of economic policy uncertainty. Karaömer & Guzel (2024) looked into the interplay of government size, economic policy uncertainty and stock returns without attempting to assess currency exchange rate management. Aawaar *et al*. (2023) revealed that the volatility of African stock markets is a dynamic process that may be explained by previous volatility, changes in oil and currency rates, the volatility of the US and UK stock markets, and Covid-19 shocks. Most of the results hold up well when subjected to sub-sample analysis. In 34 established and emerging markets, the Covid-19 pandemic increased market volatility, according to Uddin *et al.* (2021). The goal of the current study is to fill the research gap in the literature by conducting a sensitivity analysis to estimate the interactive effects of economic policy uncertainty and currency exchange rate volatility on the MENA market stock returns.

Many studies analyze bi-directional transmission effects between changes in stock returns and exchange rates. These include, He, Gokmenoglu, Kirikkaleli & Rizvi (2023); Sreenu, Rao, & Naik (2022). A long-term connection among NSE returns and the exchange rate was discovered by Sreenu, Rao, & Naik (2022). When He, Gokmenoglu, Kirikkaleli, & Rizvi (2023) applied the wavelet coherence approach in Turkey, they discovered a negative link between foreign currency rates and the Turkish stock market. The knowledge gap, however, remains: empirical insights derived for one country or stock market yields limited generalization for other countries or markets. Bhargava & Konku (2023), for instance, confined their research to the effects of currency rate swings on the US stock market only. The capital return ratio of banks, rather than the stock market index, was the response variable in another research (Keshtgar et al, 2020). The available evidence is not sufficient to draw firm inferences on the volatility spillover effects between the stock market and foreign exchange market: the results published by Hung, (2022) were rather inconsistent. The current study deviates from the conventional methodologies used in earlier research. It comprises five parts. Literature review is presented in Part 2; Part 3 discusses the methodology; in Part 4, data are analyzed. This is followed by the concluding part of the study.

2. Literature Review

The focus of this section is to review the previous research on the interactive effect of the key variables of this study on stock market returns. Unfortunately, most studies failed to examine and test the interactive effects of international economic policy uncertainty (EPU) and the volatility in the currency exchange rate on stock market performance so the review is based on the individual effect of each predictor. With regard to EPU, Durmaz (2024) asserts that stock returns were negatively impacted by growing economic policy uncertainty. According to Odionye et al. (2024), who used the cross-sectional ARDL (CS-ARDL) approach, a high level of EPU has a short-term negative impact on the stock index of Sub-Saharan African (SSA) countries, but it has little long-term negative influence on the stock market. The authors also point out that EPU significantly reduces the stock index under structural break regimes. Overall, the Covid-19 pandemic made the detrimental effects of EPU on the stock market more pronounced, suggesting that the SSA stock markets' response to EPU is very susceptible to global shocks. Umar-Farouk *et al*. (2024) applied the bivariate wavelet technique to daily data starting on April 1 to March 31, 2022. The authors obtained a significant negative interaction between exchange rates and stock returns, predominantly in the medium- to long-term frequencies.

The findings of a study by Karaömer & Guzel (2024) indicate that stock returns are adversely impacted by economic policy uncertainty. Driscoll-Kraay robust standard errors were used for the study's fixed-effects estimations. The quantile regression technique served as a framework for Muhammadriyaj & Shamsher's (2024) research, which found that the influence of economic policy uncertainty (EPU) varies across Middle Eastern stock markets. Msomi & Kunjal (2024) used the GARCH-MIDAS methodology to undertake industry-specific analysis and found that, among other things, EPU had a negative impact on volatility financials. The authors argued that the effect of EPU varied depending on the industry and that EPU should always be taken into consideration when allocating assets. Monetary policy uncertainty had a harmful effect on both the decision to hold assets and the cost of financing them according to Wuyi et al. (2023). Asafo-Adjei et al. (2020) used the wavelet coherence technique to estimate monthly time data for eight African nations from 2010M12 to 2019M12. The findings indicate a weak to substantial interaction between global EPU and stock returns across both short- and long-term timeframes. Using the VAR methodology, Istiak & Alam (2020) estimated yearly datasets for GCC nations from 1992 to 2018 and observed that EPU had a negative impact on stock market returns. Using Markov switching VAR models for each country, Kundu & Paul (2022) estimated monthly data for the G7 countries from 1998 to 2018. They revealed that the influence of EPU was negligible in bull markets and negatively significant in bear markets.

The other studies that reported negative impact of EPU on stock returns are Ma *et al*. (2022), Yuan *et al.* (2022), Kundu & Paul (2022), Chiang (2021), Dash *et al.* (2021), Xu *et al.* (2021), Kannadhasan & Das (2020), and Li et al. (2020). Using the Fourier spillover methodology, Ma *et al.* (2022) found a significant enormous spillover effect of EPU in the three markets: U.S market, Canadian market and Japanese market. Yuan *et al*. (2022) estimated monthly series for the period, 2003M1 to 2021M for the BRICS countries having deployed the Multivariate quantile VAR; For G7 markets, Kundu & Paul (2022) estimated the MSVAR model. Chiang (2021) obtained results for the

Chinese market using the dynamic conditional correlation method. Dash *et al*. (2021) estimated daily data for G7 countries' equity markets using the wavelet coherence method and reported a substantial inverse mutual movement between EPU and stock market liquidity. Xu *et al.* (2021) also reported a momentous relation between equity returns for the Chinese market and currency volatility rates using the OLS regression. Similar results were observed by Kannadhasan & Das (2020) for nine Asian emerging markets based on quantile regression method. Li *et al*. (2020) conducted the linear and nonlinear Granger causality tests to establish a two-way association between EPU and monthly stock returns in India and China.

Volatility in the currency exchange rates has also been explored by researchers. According to Awotunde *et al.* (2024), stock market capitalization is negatively and negligibly impacted by exchange rate fluctuations. Qiao *et a*l. (2024) detected a U-like connection between stock beta-loading and anticipated stock returns on the one hand, and exchange rate volatility on the other. In order to determine a short-term inverse link between exchange rates and stock returns of Tanzania's financial industry, Komba *et al*. (2024) used the ARDL bound test approach. Significant fluctuations in stock returns were brought on by fluctuations in exchange rates. Herley *et al*. (2023) have shown that exchange rate responsiveness of equities market returns in the United States is significant at high levels of exchange volatility index by performing the VAR and conditional least square tests for S&P 500 returns and log changes in USD currency rates. Additionally, remarkable swings from low to high exchange rate responsiveness were demonstrated using the Markov switching methodology. Overall, the results of research support the conclusion that equity returns react asymmetrically to fluctuations in exchange rates over a range of market volatility levels.

As mentioned earlier, Odionye *et al.* (2024) evaluated the impact of economic policy uncertainty (EPU) on stock market returns without controlling for the variations in exchange rate. Durmaz (2024) likewise re-estimated the effects of EPU on stock prices; Umar-Farouk, *et al*. (2024) investigated the interaction between stock returns and exchange rates in Africa's frontier and market economies without making effort to evaluate the moderating impact of economic policy uncertainty. Karaömer, & Guzel (2024) carried out a study on the interactive effect of economic policy uncertainty and government size on stock returns without controlling for currency exchange rates. According to Tian, El Khoury, & Alshater's (2023) research, there is a regressive and adverse association between exchange rates and value of stocks in emerging economies. In response to the gap in the literature, the current study conducted the quantile regression sensitivity analysis to investigate the interactive effects of economic policy uncertainty and exchange rate volatility on stock returns of the MENA markets using the variations in the short-term interest rate, variation in crude oil prices, and liquidity turnover as a control variable in the analysis of ten selected emerging markets of MENA stock markets. The present research departs from the usual methodologies, such as SVAR modeling, sys-GMM model estimation, fixed-effects model estimation, autoregressive distributed lag (ARDL) modeling and VECM. To trace the short-term and long-term relationships between trade policy uncertainty and stock market indices, it uses DCC GARCH, VARGARCH models and the panel quantile model that takes into account factor composition and subject heterogeneity. Such panel heterogeneous effects surpass the average effect. By so doing, the panel quantile regression eliminates outlier-related discrepancies in the results and enables the estimation of group effects that vary over the dependent variable's conditional distribution, while accounting for time-specific and individual covariates. In addition, we estimated net effects or thresholds in accordance with current interaction regressions literature (see Tchamyou & Asongu, 2017; Tchamyou, 2019; Asongu, 2020a, 2020b) to avoid the interactive regression errors, as described in Agoba, Abor, Osei & Sa-Aadu, 2020; Asongu, 2020b; Brambor *et al.* (2006). This means that the regressions were not interpreted as in linear additive models.

3. Materials and Methods

The study examines a panel of ten (10) MENA stock markets. The data were drawn from the World Bank databank. Daily data beginning from January 1, 2000 to July 30, 2024 on stock market returns, liquidity turnover, and stock market volatility were used for each stock market of the MENA countries. Stock exchanges in the MENA are Abu Dhabi Securities Exchange, Amman Stock Exchange (Jordan), Bahrain Bourse, Beirut Stock Exchange, Borsa Istanbul, Boursa Kuwait, Damascus Securities Exchange, Egyptian Exchange, Federation of Euro-Asian Stock Exchanges, Iraq Stock Exchange, Nasdaq Dubai, Qatar Stock Exchange, Saudi Exchange, Tel Aviv Stock Exchange, Tunis Stock Exchange, Khartoum Stock Exchange (KSE), Casablanca Stock Exchange (CSE), Libyan Stock Market (LSM), Bourse D'Alger - Algiers Stock Exchange (Algeria), Bahrain Stock Exchange, Tunise Stock Exchange (Tunisia), Tel Aviv Stock Exchange (Israel), Amman Stock Exchange (Jordan), Kuwait Stock Exchange, Beirut Stock Exchange (Lebanon), Muscat Securities Market (Oman), Palestine Securities Exchange, Doha Securities Market (Qatar), Saudi Exchange (Saudi Arabia), Abu Dhabi Securities Exchange (UAE), Dubai Financial Market (UAE), and Mercantile Exchange (UAE). We focus our analysis on ten of these stock markets for reasons of information accessibility. These are Abu Dhabi Securities Exchange (UAE), Saudi Exchange, Iraq Stock Exchange, Amman Stock Exchange, Egyptian Stock Exchange, Tunise Stock Exchange, Kuwait Stock Exchange, Muscat Securities Market, Doha Securities Market and Borsa Istanbul. Stock return was calculated as the difference between the log values of today's stock price and the stock price of yesterday. Stock market return volatility was calculated as the daily standard deviation of the percentage change in the intraday value of stock prices. The percentage change in monetary aggregates was used to calculate the economy's liquidity levels. The study used the monetary base as its monetary aggregate, which comprises the total amount of money in exchange and the central bank's percentage of commercial bank reserves.

Consistent with existing literature, we utilized the U.S. economic policy uncertainty to represent the World uncertainty Index (WUI), which was developed by Ahir *et al*. (2020; 2022), as a proxy for international policy uncertainty in relation to the unpredictable economic and political circumstances with many unknown risks. Accordingly, the United States' U. S. economic policy uncertainty index is multiplied by one million to rescale it so that an index of 500 indicates that the word "uncertainty" makes up 0.05 percent of all words; considering that Economist Intelligence Unit (EIU) reports are typically 10,000 words long, this is roughly 5 words per report. As a result, the WUI index measures uncertainty globally on the basis of GDP weighted average of 143 country-specific economic policy uncertainty indices. Accordingly, www.worlduncertaintyindex.com provides a direct connection to country-specific uncertainty data used by Ahir *et al* (2020) to construct the index.

The present study, which examines the ten chosen MENA stock markets, uses the variation in crude oil prices as a control variable in the quantile regression sensitivity analysis to investigate the effects of short-term interest rate volatility and liquidity crisis on stock markets. Estimating how various explanatory variables affect different quantiles of the dependent variable is the goal of the quantile regression. It has been established in the literature that regressors are likely to have different impacts on the outcome variable at different quantiles. This lack of information about the impact on various countries at various quantiles is reflected in OLS's requirement that the slope coefficient be the same for all quantiles (Lamarche, 2021). The correlated random-effects panel quantile model was estimated in the current research. The specification of the panel quantile regression model is as follows:

$$_{y_{it}}(\tau | x_{it}, \phi_i) = x_{it}^{'}\delta + f(x_i) + \quad _{\in}(\tau | x_i) = x_{it}^{'}\delta(\tau) + f(x_i) \tag{1}$$

where $Q\in(\tau \;| x_i)$ is the quantile of the composite error, $\in_{it} = \phi_i + u_{it}$. The process of linking random effects entails simulating $f(x_i)$ as a B-spline linear expansion:

$$f(x_i)^! \phi(\tau) = \gamma(x_{i1})^! \phi_1(\tau) + \gamma(x_{i2})^! \phi_2(\tau) + ... + \gamma(x_{iN})^! \phi_N(\tau) \tag{2}$$

where $\gamma(x_{ij}) = (\gamma_1(x_{ij}),...,\gamma_{k_v+d+1}(x_{ij}))^!$ is an underlying function of a B-spline, k_v represents the quantity of knots, d represents the B-spline basis's degree, and ϕ is a vector representing the spline coefficient (Lamarche, 2021). The quantile regression model for all coefficients becomes:

$$\arg\min \sum_{j=1}^{m} \sum_{i=1}^{v} \sum_{t=1}^{N} \alpha_j \omega_{\tau j} (y_{it} - x_{it}^! \delta(\tau_j) - f(x_i)^! \phi(\tau_j) - \theta_i) + \eta \sum_{i=1}^{n} |\theta_i| \tag{3}$$

where α_j is a relative weight given to the j^{th} quantile. The weight regulates the impact of the m quantiles on the model's parameter estimation process. According to Koenker (2004; 2017), the vector of weights, $\alpha = [\alpha_1, \alpha_2, ..., \alpha_m]^!$ and $\alpha_j = 1/m \;\forall\; 1 \le j \le m$. The ideal vector of weights is provided by the conventional random choices: 0.25, 0.5. Guided by the idea that the Gaussian random effects estimator could be interpreted as a penalized least squares estimator, the penalized quantile regression estimator was given as follows:

$$\arg\min \sum_{j=1}^{m} \sum_{i=1}^{n} \sum_{t=1}^{T} \alpha_j \omega_{\tau j} (y_{it} - x_{it}^{!} \delta(\tau_j) - \phi_i) + \eta \sum_{i=1}^{n} |\phi_i| \tag{4}$$

The adjustment parameter η regulates the percentage of regression to zero, whereas α_j governs the impact of the quantiles on the estimation of each of the effects. The methodology used to estimate the quantile regression slope parameters of the panel group effects, where individual parameters are permitted to have a group effect, was based on a convex minimization of equation (2), in accordance with the work of Gu & Volgushev (2019):

$$\arg\min \sum_{i=1}^{n} \sum_{t=1}^{T} \omega_{\tau j} (y_{it} - x_{it}^{!} \delta - \phi_i) + \sum_{i=1}^{n} \eta_{ij} \left|\phi_i - \phi_j\right| \tag{5}$$

The standard model specification for stock market returns is given by equation (6):

$$sreturn_{it} = Z_{it} \delta_{\psi} + v_{it} \tag{6}$$

$$Z_{it} = \left[intvol_{it}, liqtov_{it}, wui,\ exrvol, (wui \times exrvol),\ oilpvol_{it}\right]$$

where Z_{it} the vector of explanatory variables; δ_{ψ} are the k×1 regression coefficients at the ψ^{th} quantile of the stock return (*sreturn*), *liqtov* is liquidity turnover, *wui* is world uncertainty index, *exrvol* is exchange rate volatility, ($wui \times exrvol$) is interacted variable between uncertainty and volatility of exchange rates, *oilpvol* is oil price volatility. The equivalent quantile regression is thus specified as follows:

$$\begin{aligned} \psi(sreturn / \Omega_{time}) = \delta_{0\psi} + \delta_{1\psi} intvol_{i\psi} + \delta_{2\psi} liqtov_{it} + \\ \delta_{3\psi} wui + \delta_{4\psi} exrvol + (wui \times exrvol)\delta_{5\psi} + \delta_{6\psi} oilpvol_{it} + v_{it} \end{aligned} \tag{7}$$

Where $\psi(sreturn / \Omega_{time})$ describes the conditional quantile of stock returns, $|_{time}$ is the information accessible at time t. Given that the quantile regression estimator minimizes an asymmetrically weighted sum of absolute errors, equation (7) is re-specified as follows:

$$Min \sum_{t=1}^{T} \phi_{\psi}(z) = |z| + (2\psi - 1) z (sretun_{it} - Z_{it} \delta_{\psi}),\ 0 < \psi < 1 \tag{8}$$

The final quantile equation for the return-volatility-liquidity nexus is as given in equation (9):

$$Min \left[\sum \begin{matrix} \psi \,|\, sretun_{it} - smvol_{it} \delta_{1\psi} - liqtov_{it} \delta_{2\psi} - ipu\delta_{3\psi} - exrvol\delta_{4\psi} - (ipu \times exrvol)\delta_{5\psi} - oilpvol_{it} \delta_{6\psi} \,| \\ + \sum (1 - \ell) \,|\, sretun_{it} - smvol_{it} \delta_{1\psi} - liqtov_{it} \delta_{2\psi} - wui\delta_{3\psi} - exrvol\delta_{4\psi} - (ipu \times exrvol)\delta_{5\psi} - oilpvol_{it} \delta_{6\psi} \end{matrix} \right] \tag{9}$$

The estimation of equation (9) was based on the quantreg inbuilt in the R-package version 5.85. The quantile regression method permits heterogeneity of the marginal effects of international policy uncertainty measured as the United States' (U. S.) economic policy uncertainty index, exchange rate volatility, variations in short-term interest rate and the variations in BRENT crude oil prices, to change at different quantiles of stock returns by estimating δ_ψ using different values of ψ. The estimation of the panel quantile model was further justified by the fact that methodological structures offer more robust and insightful empirical analytics for simulating with factor composition and subject heterogeneity. This eliminates the mis-specification that results from failing to account for unknown variation and the bias caused by estimates that arises from estimating a lot of noise parameters in a nonlinear panel model (Yanxi *et al.*, 2024; Kato *et al.*, 2012). Consequently, panel or group heterogeneous effects that surpass the average effect are taken into account by the panel quantile regression equation. More importantly, the panel quantile estimation eliminates outlier-related discrepancies in the results. It allows for the estimation of group effects that vary over the dependent variable's conditional distribution while accounting for time-specific and individual covariates.

Table 1. Description of Variables and Stock Markets

Countries	Stock/Equity Market	Variable	Variable Name	Measure
UAE	Abu Dhabi Securities Exchange	SRETUN	Stock market returns	Percentage changes in the returns of a given stock/equity
Saudi Arabia	Saudi Exchange	SMVOL	Stock market volatility	Chicago Board Options Exchange Volatility Index
Iraq	Iraq Stock Exchange	LIQTOV	Liquidity turnover	
Jordan	Amman Stock Exchange	EXRVOL	Exchange rate volatility index	Changes in bilateral exchange rate returns
Egypt	Egyptian Stock Exchange	OILPVOL	Oil price volatility	Variations in the Brent crude oil prices
Tunisia	Tunise Stock Exchange	IPU × EXRVOL	Interacted variable	The interaction of economic policy uncertainty and volatility in exchange rate
Kuwait	Kuwait Stock Exchange	EPU	Economic policy uncertainty	As developed by Ahir et al. (2020; 2022)
Oman	Muscat Securities Market	WEPU	World economic policy uncertainty	As developed by Ahir et al. (2020; 2022), as a proxy for international policy uncertainty
Qatar	Doha Securities Market	IPU	International economic policy uncertainty	U. S. economic policy uncertainty index
Turkey	Borsa Istanbul	MENA	Middle East and North Africa Countries	

Source: Authors' compilations

4. Results and Discussions

According to Table 2, the highest liquidity turnover occurred at the Saudi Exchange, as shown by a maximum value 0.4139%. Also, it has the highest average value of 0.2204%. The reported standard deviations point toward the fact that liquidity crisis was most volatile in Abu Dhabi Securities Exchange with the highest deviation of 2.3519%. On the other hand, the least volatile turnover of liquidity occurred in Borsa Istanbul. The various statistics of kurtosis exceeded 3, the Jarque-Bera statistics were also very high. This points to a non-normal distribution for liquidity crisis of all emerging markets. The skewness statistics are positive for all market.

Table 2. Summary Statistics of liquidity turnover (liqtov)

Markets	Mean	Max	Skewness	Quantile	Std. Dev.	Kurtosis	J-B
Iraq Stock Exchange	0.0203	0.0505	0.0567	0.0219	0.1256	10.7200	3.0269
Egyptian Stock Exchange	0.0201	0.3193	0.0829	0.0350	0.1453	4.9012	23.487
Tunisia Stock Exchange	0.1221	0.0979	0.3149	0.0277	0.2386	8.0945	6.0012
Amman Stock Exchange	0.0204	0.0998	0.0869	0.0287	0.3356	8.9112	10.1453
Borsa Istanbul	0.1102	0.1269	0.4157	0.018	0.0587	7.9140	4.2279
Kuwait Stock Exchange	0.0201	0.3155	0.0597	0.0203	0.1278	115.631	5.4893
Doha Securities Market	0.0214	0.0882	0.3605	0.0363	0.2450	7.3622	3.4891
Muscat Securities Market, Oman	0.0208	0.0905	0.3387	0.0330	0.3409	11.889	9.389
Saudi Exchange	0.2204	0.4139	0.4538	0.0316	1.3478	55.0742	1.2934
Abu Dhabi Securities Exchange	0.0250	0.3091	0.3424	0.0451	2.3519	4.8566	15.801
All	0.0206	0.5239	0.4538	0.0302	0.1420	21.0923	5.17

Source: Authors' R package version 5.85 estimates (2024)

Table 3 illustrates the summary statistics for market volatility for all markets. In Table 2, the requirement for normality of the distribution of volatility could not be fulfilled as the reported kurtosis coefficients all exceeded 3 throughout the panel of markets for all countries covered by the research. In effect, there is volatility clustering across all sampled markets, although at varying degrees. The market in Saudi Arabia had the highest volatility across the study period with a deviation of 3.546% while the market in Jordan reported the lowest volatility given by 0.172%. The mean volatility of the market in UAE is the highest with a value of 1.932% while the market in Oman had the lowest mean volatility of 0.0134%.

Table 3. Summary Statistics of short-term interest rate volatility (intvol)

Markets	Mean	Max	Skewness	Quantile	Std. Dev.	Kurtosis	J-B
Iraq	0.3422	0.3516	-0.3891	0.0431	1.1520	17.7072	29.1901
Egypt	0.5441	0.0951	-0.3522	0.0329	1.1401	15.938	6.2870
Tunisia	0.2351	0.5466	-0.4823	0.0309	1.1502	59.949	8.0265
Jordan	0.8192	0.0975	-1.0204	0.0322	0.1721	282.962	9.0337
Turkey	0.4560	0.0692	-0.0575	0.0113	1.2373	6.8142	16.2150
Kuwait	0.2570	0.0762	-0.0936	0.0274	1.2354	7.1639	7.9238
Qatar	0.1130	0.3613	-0.3677	0.0265	1.3360	51.050	10.2293
Oman	0.0134	0.3694	-0.3357	0.0335	2.3491	9.8402	4.5632
Saudi Arabia	0.3681	0.0979	-0.3292	0.0356	3.5466	5.9414	7.3856
UAE	1.9320	0.0846	-0.09322	0.0299	1.6320	9.5093	15.6801
All	0.1467	0.3469	-1.000	19.0117	0.1128	343.472	10.38

Source: Authors' R package version 5.85 estimates (2024)

As shown in Table 4, Iraq Stock Return had the highest mean return of 0.6253% throughout the years while Doha Securities Market return had a day in which stock returns declined by a 0.0215%.The distribution of stock returns has negative skewness for all markets. The kurtosis and J-B statistics are greater than 3. This provides evidence against a normally distributed sample of returns. The reported standard deviations indicate that Jordan stock market, Amman Stock Return had the highest variation of returns given a value of 2.1127%, whereas the stock market in Doha Securities Market Return with a deviation of 0.1342% was the least volatile in terms of returns.

Table 4. Summary Statistics of stock return volatility (sreturn)

Markets	Mean	Max	Skewness	Quantile	Std. Dev.	Kurtosis	J-B
Iraq Stock Return	0.6253	0.0699	-0.0501	0.0284	1.2323	13.9001	12.387
EGX 30 Return	0.1200	0.1437	-0.0247	0.0203	0.6208	10.4123	4.9672
TUNINDEX Return	0.1148	0.266	-0.0443	0.0223	0.2245	11.7345	5.4973
Amman Stock Return	0.2542	0.2059	-0.1547	0.112	2.1127	9.7146	13.488
Borsa Istanbul Return	0.3291	0.0598	-0.0237	0.0249	0.2278	5.5122	5.3492
Kuwait Stock Return	0.1342	0.0865	-0.0922	0.0221	0.4341	18.3091	4.7621
Doha Securities Market Return	0.0215	0.1793	-0.0684	0.0301	0.1342	4.7243	9.0283
Muscat Securities Market Return	0.4320	0.3658	-0.1745	0.0277	0.2336	37.9214	10.3221
Saudi Exchange Return	0.4208	0.0941	-0.0847	0.0209	1.6279	36.8633	14.3739
Abu Dhabi Securities Exchange Return	0.2253	0.4149	-0.5513	0.0332	0.2529	47.8290	9.367
All	0.5211	0.4649	-0.5513	0.0243	4.1344	137.5662	12.347

Source: Authors' R package version 5.85 estimates (2024)

According to Table 5, Turkey had the highest mean return volatility, at 176.107%. Iraq's exchange rate volatility distribution was negatively skewed, with a value of -0.687. Both the J-B and kurtosis statistics are higher than 3. This offers proof against a sample of currency rate volatility that is normally distributed. According to the reported standard deviations, the exchange rate in Saudi Arabia was the most fluctuating, with a value of 1951.079, while the UAE had the least volatile currency returns, with a deviation of 100.139.

Table 5. Summary Statistics of exchange rate volatility (exrvol)

Markets	Mean	Max	Skewness	Quantile	Std. Dev.	Kurtosis	J-B
Iraq	110.079	5672.070	-0.687	-1.095	121.223	3.901	1112.387
Egypt	130.025	1459.082	1.300	-0.034	167.608	5.123	1734.062
Tunisia	140.612	1271.030	1.052	3.900	120.245	12.735	1345.273
Jordan	117.410	1693.109	1.289	12.240	192.127	5.716	1313.415
Turkey	176.107	1028.087*	1.764	10.047	150.278	5.512	1095.142
Kuwait	103.110	1731.004	0.309	4.020	103.431	6.091	1094.621
Qatar	122.789	1289.570	1.451	-2.095	1790.142	3.243	1349.083
Oman	137.012	1827.08	3.193	5.014	1870.236	5.214	1730.521
Saudi Arabia	180.134	1230.100	1.259	1.490	1951.079	3.693	1891.739
UAE	153.200	1324.109	-1.094	3.300	100.139	5.290	1376.067
All	19314.129	1379.075*	1.076	5.047	1974.125	7.562	187912.547

Source: Authors' R package version 5.85 estimates (2024)

Table 6 reports the descriptive statistics of oil price variation and world uncertainty index. Oil prices have a mean fluctuation of 0.3387% and a standard deviation of 1.93863% respectively. The volatility in oil prices has a kurtosis of 71.389% and a J-B statistic of 50.3728%. These combination shows that the distribution of oil price variations does not follow the normal distribution. Accordingly, various statistics of kurtosis, e.g. Jarque-Bera, and skewness jointly establish non-normality of the distribution of liquidity crisis, stock returns, market volatility, and oil price variations. However, with the application of the quantile regression that bases analysis on the conditional effects of model predictors, the absence of normal distribution was overcome as attention shifted away from the OLS estimates.

Table 6. Summary Statistics of world uncertainty index (wui) and Oil price variation (oilpvol)

Statistical Measures	Values of oilpvol	Statistical Measures	Values of ipu
Mean	0.3387	Mean	1.2563
Maximum	1.0387	Maximum	0.3809
Skewness	0.2387	Skewness	1.1937
Quantile	0.0037	Quantile	0.2541
Standard Deviation	1.93863	Standard Deviation	1.2653
Kurtosis	71.389	Kurtosis	2.3861
Jacque Bera	50.3728	Jacque Bera	5.2879

Source: Authors' R package version 5.85 estimates (2024)

As shown in Table 7, unit root was not present in any of the datasets. All tests for data stationarity rejected the null hypothesis with statistical significance (p<.01) and accepted all alternative hypotheses. If an economic series is level-stationary, then co-integration tests are typically disregarded. To confirm the long-term relationship status of the variables for the respective groups, the paper uses panel co-integration test, which can reveal the presence of significant correlation among our variables in the long-run.

Table 7. Unit root Test Results

Test method	sreturn	intvol	liqtov	oilpvol	exrvol	ipu
Levin, Lin & Chu t*	-48.081***	-11.081***	-17.236***	-5.926***	-119.540***	6.580***
Breitung t-stat	-18.128***	-12.194***	-23.71***	-14.542***	-106.170***	-5.023***
Im, Pesaran and Shin W-stat	-27.102***	-29.497***	-17.455***	-12.427***	-197.057***	10.175***
ADF - Fisher Chi-square	48.135***	20.45***	23.91***	57.92***	156.108***	4.328***
PP - Fisher Chi-square	26.149***	19.322***	22.85***	25.196***	110.546***	3.360***

Source: Authors' R package version 5.85 estimates (2024). *Notes*: *** Significant at 1%; ** significant at 5%; * significant at 10%.

The Fisher-Johansen panel co-integration tool produced the results presented in Table 8. In Table 7, all statistics are significant (p<.01) and confirm long term relationship between stock returns, liquidity crisis and market volatility.

Table 8. Co-integration Rank Test Results

No. of CE(s)	Fisher Stat. (trace test)	Fisher Stat. (max-eigen test)
0	196.4***	114.4***
≤1	2645***	156.29***
≤2	5386**	3524***

Source: Authors' R package version 5.85 estimates (2024). *Notes*: *** Significant at 1%; ** significant at 5%; * significant at 10%; p-values take the form of asymptotic Chi-square distribution.

In this study, we estimated the quantile regression for 9 quantiles. The OLS estimates were ignored in this analysis because it does not measure conditional effects of the explanatory variables on the dependent variable. Hence, the focus of analysis was shifted to the quantile estimates. Table 8 reports the quantile estimates before the outbreak of covid-19 pandemic; these show that the 10th, 20th, 30th, and 40th percentile of stock returns were negatively correlated with the 10th, 20th, 30th, and 40th percentiles of short-term interest rate volatility, given the associated coefficients of 0.017 for Q1, 0.012 for Q2, 0.0011 for Q3, and 0.0041 for Q4. The observed quantile effects are low. Besides, the reduced effects failed the significant test at the 5% level. Only at the 50th, 60th, 70th, 80th and 90th percentiles, we had significant negative conditional effects of short-term interest rate volatility on stock returns. These quantile effects were given by the coefficients, -0.1020, -0.0356, -0.0114, -0.0163 and -0.1386 for the50th, 60th, 70th, 80th and 90th percentiles respectively. Within the same sample period before the outbreak of pandemic, we estimated positive quantile coefficients of liquidity turnover at 10th, 20th, 30th, and 40th quantiles. These include 0.103 for Q1, 0.018 for Q2, 0.039 for Q3, and 0.015 for Q4. Only the 40th quantile effect of liquidity turnover on stock returns was statistically significant. We had negative conditional effects of liquidity turnover on stock returns as measured by -0.3114, -0.1144, -0.3150, -0.2149 and -0.1953 for the 50th, 60th, 70th, 80th and 90th percentiles respectively. Only the 80th and the 90th quantile effects of liquidity crisis on stock returns were substantial.The quantile effects at Q1, Q2, Q3, Q5, Q6, and Q7 were insignificant. In effect, the returns also positively reacted to liquidity turnover from the 10th through to the 40th quantiles. Even when the conditional effects of liquidity crisis on returns from the 50th, 60th, 70th, 80th and 90th percentiles were negative, the observed conditional effects for most quantiles were not significantly different from zero.

Table 8 report quantile estimates after the outbreak of covid-19 pandemic. In Table 8, the coefficients of volatility of stock market for different quantiles are -0.1812 at Q1, -0.2891 at Q2, -0.372 at Q3, -0.465 at Q4, -0.133 at Q5,-0.159 at Q6, -0.246 at Q7,-0.713 at Q8, and -0.1964 at Q9. Similarly, the coefficients of liquidity risk for different quantiles after the outbreak of pandemic are -0.4761 at Q1,-0.124 at Q2, 0.0163 at Q3,-0.492 at Q4, -0.3351 at Q5,-0.1178 at Q6,-0.3192 at Q7,-0.2916 at Q8, -0.1975 at Q9. The conditional effects are all negative throughout the quantiles. Aside from the conditional effects at the 50th, 80th, and 90th quantiles, the other quantile effects are insignificant at the 5% level. Accordingly, stock returns adversely reacted to volatility in the short-term interest rate but positively to liquidity turnover during the pandemic. The conditional effects of volatility in the interest rate were also observed to be higher compared to the conditional effects before the covid-19; the conditional effect of liquidity turnover was smaller in magnitude before the covid-19 than after the covid-19 era. For example, after the outbreak of the pandemic, the percentage rise in the interest rate volatility stirred a decline in returns by 0.133%, 0.159%, 0.246%, 0.7132%, and 0.1964% at fifth, sixth, seventh, eighth and ninth quantile respectively. The stock returns declined because of interest rate volatility by 0.1020% at the 50th quantile, 0.0356% at the 60th quantile, 0.0114% at the 70th quantile, 0.0163 at the 80th quantile, and 0.1386% at the 90th quantile, before the pandemic smashed the market. Similarly, after the outbreak of covid-19, liquidity turnover in the market reduced returns by 0.3351%, 0.1178%,0.3192%,0.2916% and 0.1975% at the fifth, sixth, seventh, eighth and ninth quantile respectively, whereas before the outbreak, the returns effects of liquidity turnover were lower as reported by 0.3114%, 0.1144%, 0.3150%, 0.2149% and 0.1953% for the 50th, 60th, 70th, 80th and 90th quantile respectively.

The range of quantile effects of oil price volatility on stock returns prior and after the outbreak of the pandemic were all significant at the 1% level. The effects were negative all through the quantile. Nevertheless, the absolute values of the conditional effects of oil price volatility after the pandemic all exceeded unity across the quantiles as against the lower values obtained before the pandemic. These quantile effects varied ranging from 0.0113 before the pandemic to 1.1203 after the pandemic at the 10th quantile, 0.2371 to 1.0116 at the 20th quantile, 0.1160 to 1.1094 at the 30th quantile, 0.1482 to 1.7182 at the 40th quantile, 0.128 to 1.4870 at the 50th quantile, 0.410 to 1.5864 at the 60th quantile, 0.5134 to 1.3589 at the 70th quantile, 0.4092 to 1.0291 at the 80th quantile, and 0.1386 before the pandemic to 1.2758 after the pandemic at the 90th quantile.

The key findings of the study include low levels of quantile effects of short-term interest rate volatility on stock returns and low levels of quantile effects of liquidity turnover on stock returns before the outbreak of covid-19 pandemic. We mostly observed that the absolute returns effect of short-term interest rate volatility was closer to unity after the outbreak of pandemic. Besides the significance of all the conditional effects of short-term interest rate volatility and liquidity crisis after covid-19, further sensitivity analysis of the impact of short-term interest rate volatility on stock returns reveals that the observed impact was larger after the pandemic hit the market compared to the impact before the pandemic began. The observed conditional effects of liquidity turnover ratio on returns were significant only at 3 quantiles before and after the outbreak of pandemic and these effects were greater after the pandemic. The stock returns negatively correlated with short-term interest rate volatility and liquidity turnover before the outbreak of pandemic from the 10th, 20th, 30th, and 40th quantile. The quantile effects of oil price volatility on returns were greater after the covid-19 outbreak. Ample empirical evidence makes it possible to observe shifting dynamics in the impact of market volatility on returns as we move from the pre-pandemic to the post-pandemic era. Hence, it is advisable to forestall stability in the stock market as it is an evidence of less regulations of the market by Central Banks of MENA countries after the covid-19 pandemic. These results indicate that the conditional distribution of the dependent variable is symmetric around the median for all the estimations. This can be seen from the estimated Wald statistics with probability values greater than 0.05.

The world economic policy uncertainty index was noticeably negative for all estimated coefficients, according to the panel quantile regression results in Table 9 and Table 10. Both the sign and, to a certain extent, the size of the estimated coefficients are consistent. Nevertheless, when compared to the results generated prior to the epidemic (see Table 9), the size impacts of the policy variable after the Covid-19 outbreak are huge in absolute values (see Table 10). The fact that the world uncertainty index's quantile effects on stock returns before and after the pandemic started were all substantial at the 1% level is quite noteworthy. Throughout the quantile, the consequences were adverse. Similar estimation results were obtained for exchange rate volatility. The panel quantile regression results also show clearly that the fluctuation in the bilateral exchange rates of the countries exerted negative impact on stock return at different quantiles at the 1% level. The interaction between the variables of exchange rate fluctuations and worldwide economic policy uncertainty resulted in substantial negative coefficients of interaction, as shown in Tables 11 and 12. All quantiles have negative coefficient sizes.

Table 9. Quantile Results for MENA Markets before the Outbreak of Covid-19

Quantile	intvol	Prob (intvol)	liqtov	Prob (liqtov)	oilpvol	Prob (oilpvol)	Constant	Prob (constant)
Q 0.1	-0.5170	0.6780	0.1030	0.1120	0.0113	0.0000	-0.4250	0.0210
Q 0.2	-0.6120	0.0920	0.0180	0.3547	0.2371	0.0000	0.0375	0.0000
Q 0.3	-0.3211	0.0460	0.0390	0.2695	0.1160	0.0000	0.0510	0.0000
Q 0.4	-0.4341	0.0350	0.0150	0.0000	0.1482	0.0000	0.6130	0.0000
Q 0.5	-0.3020	0.0000	0.3114	0.1500	0.1280	0.0000	0.0915	0.0000
Q 0.6	-0.4356	0.0000	0.6144	0.4670	0.4100	0.0000	0.1446	0.0011
Q 0.7	-0.5114	0.0000	0.3150	0.8972	0.5134	0.0000	1.1197	0.0000
Q 0.8	-0.9163	0.0000	0.2149	0.0000	0.4092	0.0051	2.0271	0.0000
Q 0.9	-0.4386	0.0000	0.2953	0.0000	0.1386	0.0000	1.0352	0.0000
Quantile Slope Equality Test, Wald test: 70.02 (0.00) Ramsey Reset Test: QLR Lambda stat: 3.9855 (0.2), Wald = 0.0047 (0.586)								

Source: Authors' R package version 5.85 estimates (2024)

Table 10. Quantile Results for MENA Markets after the Outbreak of Covid-19

Quantile	intvol	Prob (intvol)	liqtov	Prob (liqtov)	oilpvol	Prob (oilpvol)	Constant	Prob (constant)
Q 0.1	-0.1812	0.0000	-0.1761	0.002	1.1203	0.000	-0.4250	0.021
Q 0.2	-0.2891	0.000	-0.1240	0.001	1.0116	0.000	0.0375	0.000
Q 0.3	-0.1372	0.000	-0.0163	0.005	1.1094	0.000	0.0510	0.000
Q 0.4	-0.1465	0.000	-0.1020	0.000	1.7182	0.000	0.6130	0.000
Q 0.5	-0.1330	0.000	-0.1351	0.000	1.4870	0.000	0.0910	0.000
Q 0.6	-0.1590	0.000	-0.1178	0.5430	1.5864	0.000	0.1440	0.001
Q 0.7	-0.2460	0.000	-0.4192	0.2981	1.3589	0.000	0.1190	0.000
Q0.8	-0.7130	0.000	-0.2916	0.0000	1.0291	0.000	0.0270	0.000
Q 0.9	-0.1964	0.0000	-0.1275	0.0000	1.2758	0.000	1.0350	0.000
Quantile Slope Equality Test, Wald test: 65.33 (0.00) Ramsey Reset Test: QLR Lambda stat: 5.689 (0.3), Wald = 0.0023 (0.4520)								

Source: Authors' R package version 5.85 estimates (2024)

Table 11. Quantile Results for the Effects of Uncertainty and Exchange Rate Volatility on MENA Market Returns before the Outbreak of Covid-19

Quantiles	Q0.1	Q0.2	Q0.3	Q0.4	Q0.5	Q0.6	0.7	Q0.8	Q0.9
ipu	-0.0026	-0.0127	-0.0191	-0.0361	-0.0021	-0.0032	-0.0016	-0.0014	-0.0011
Prob(ipu)	0.002	0.0122	0.0012	0.000	0.000	0.0010	0.0023	0.0144	0.1032
exrvol	-0.3801	-0.0193	-0.0091	-0.0209	-0.0423	-0.0103	-1.0039	-0.02782	-0.1003
Prob(exrvol)	0.000	0.0192	0.1028	0.0021	0.0027	0.0036	0.0046	0.0052	0.0001
ipu.exrvol	-0.1340	-0.1091	-1.1083	-0.1153	-0.1091	-0.0251	-0.0234	-0.0129	-0.0117
Prob (ipu.exrvol)	0.000	0.0178	0.0008	0.0012	0.0062	0.00237	0.0041	0.0087	0.0001
Net effect (Threshold)	-0.0189	-0.0030	-0.0012	-0.0013	-0.0122	-0.0113	-0.0192	-0.1032	-0.0918
Prob (Threshold)	0.256	0.2670	0.3671	0.4320	0.2293	0.5209	0.2673	0.2632	0.3872

Source: Authors' R package version 5.85 estimates (2024)

Table 12. Quantile Results for the Effects of Uncertainty and Exchange Rate Volatility on MENA Market Returns after the Outbreak of Covid-19

Quantiles	Q0.1	Q0.2	Q0.3	Q0.4	Q0.5	Q0.6	0.7	Q0.8	Q0.9
ipu	-0.1860	-0.2671	-0.2291	-0.0142	-0.0145	-0.0146	-0.0198	-0.1875	-0.2351
Prob(ipu)	0.000	0.0000	0.0000	0.000	0.000	0.0010	0.0015	0.0001	0.1500
exrvol	-1.1186	-0.0518	-0.1320	-0.0127	-0.1455	-0.2183	-1.0119	-0.0193	-0.1340
Prob(exrvol)	0.0000	0.0002	0.0005	0.0003	0.0001	0.0003	0.0012	0.0120	0.0000
ipu.exrvol	-0.1459	-0.1163	-0.1924	-0.1491	-0.1536	-0.0197	-0.1012	-0.0142	-0.0123
Prob (ipu.exrvol)	0.000	0.0005	0.0051	0.0003	0.0000	0.00000	0.0000	0.0000	0.0000
Net effect (Threshold)	-0.0067	-0.0187	-0. 0209	-0.0921	-0.0125	-0.0026	-.0163	-0.0248	-0.0189
Prob (Threshold)	0.0000	0.0000	0.0001	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000

Source: Authors' R package version 5.85 estimates (2024)

5. Discussion

The results of panel quantile regressions with reliable standard errors showed that the stock returns of MENA markets were adversely affected by the world economic policy uncertainty. Additionally, an empirically negative and statistically strong coefficient of interaction term was generated by the variables of exchange rate volatility and uncertainty surrounding global economic policy. To ensure that the estimated effects are relevant for policy analysis, we estimated the net effects/

threshold of the interacted variables on stock market returns. The non-linear size effect of policy uncertainty and exchange rate fluctuation was found robust. The estimated net effects, which include both the unrestricted and the conditional interactive effects of international economic policy uncertainty and exchange rate fluctuation, are significant at the 1% level after the Covid-19 outbreak. This is not the case for the threshold effects of the interacted variable prior to the Covid-19 pandemic, even though the threshold effects of the interacted variable were adverse before the incidence of the pandemic.

These results demonstrate that stock returns decline considerably in response to global economic policy in the face of extremely volatile exchange rates in each of the countries the study examined. These findings complement those of Karaömer & Eser Guzel (2024), Kundu & Paul (2022), Ma *et al.* (2022), Yuan *et al.* (2022), Xu *et al.* (2021), Chiang (2021), Dash *et al.* (2021), Kannadhasan & Das (2020) , Asafo-Adjei *et al.* (2020), Li *et al*. (2020), and Istiak & Alam (2020), and Su *et al*. (2019). Using the estimates based on the fixed-effects model, Karaömer & Eser Guzel (2024) determined that stock returns are adversely impacted by economic policy uncertainty. Also, the coefficient of interaction between the variables of government size and policy uncertainty was likewise negative and significant, suggesting that as government size increases, so does the negative reaction of stock returns to policy uncertainty.

Kundu & Paul (2022) applied the MSVAR approach to determine that a rise in economic policy uncertainty lowers stock returns. The evidence was drawn from the monthly series 1998M1-2018M8 for G7 countries. In a similar vein, Ma *et al*. (2022) used the Fourier spillover model on a monthly data sample for G7 countries from 2000M1-2019M5 and established that the US, Canada, and Japan stock market volatility had a significant EPU spillover effect. In France, Germany, and Italy, the spillover impact lasted longer. Yuan *et al.* (2022) used the Multivariate Quantile VAR approach on quarterly data from 2003M1–2021M9 for the BRICS and found that EPU had a negative influence on the stock market. In China, Xu *et al.* (2021) used the OLS estimation technique on monthly data and found that EPU had a negative impact on monthly stock returns. Chiang (2021) used the dynamic conditional correlation analysis with data on the Chinese stock exchange and found a robust negative stock return effect of EPU. Dash *et al.* (2021) used the wavelet coherence method to analyze daily data for G7 countries and found a significant causal association between EPU and stock market liquidity, with EPU and liquidity moving in the opposite direction.

Using quantile regression analysis, Kannadhasan & Das (2020) analyzed data on nine Asian emerging markets and determined that EPU had a negative effect on the stock market. In their wavelet coherence analysis of data for eight African nations, Asafo-Adjei *et al.* (2020) revealed that the link between GEPU and stock returns was tenuous at first but grew stronger over time. Li *et al*. (2020) tested monthly data using both linear and non-linear Granger tests for the Chinese and Indian markets and established a bi-directional significant association between EPU and stock returns. Istiak & Alam (2020) used the VAR model to analyze data for the GCC countries from 1992 to 2018 and found that EPU had a negative impact on stock market returns.

Higher economic policy uncertainty raises market return volatility in G-7 nations, according to Su *et al*. (2019).

The research findings complement the NARDL results of Gyamerah et al (2024) that provided evidence of global economic policy uncertainty (GEPU)'s short-term asymmetric effects on green bond returns. In particular, only short-term negative GEPU shocks affect green bond returns, causing them to decrease. Adam *et al*. (2022) found that economic policy uncertainty had a negative impact on the returns of most Islamic stocks, with the exception of the Dow Jones Islamic Market (DJIM), using the continuous wavelet transform and wavelet coherence ratios, which enable the decomposition of time series across time scales. The returns of Islamic stocks following the Covid-19 pandemic are particularly influenced by both economic policy uncertainty and volatility. However, although we found negative effects for the volatility in exchange rates on stock returns, Adam *et al*. (2022), in their study, came to the conclusion that volatility significantly boosted the profits of a broad range of Islamic stocks. This is not supported by the present research outcome. The difference in estimation methods could be responsible.

The present paper may have significant implications for financial investors. The market's response to interest rate volatility can hardly be predicted with a sufficient degree of certainty. According to the efficient market theory (Spulbar *et al*., 2022), the market reacts spontaneously to adjustments in the interest rate even when market players operate rationally and base their decisions on all available facts regarding stock prices. Irrational decision-making that leads to market inefficiencies could be induced in conjunction with human behaviour, which is frequently influenced by perceptual biases. That is why the real-world financial markets' conduct deviates from the EMT. In actuality, not all accessible asset price information may be reflected effectively by financial markets. In order to protect themselves from interest rate volatility risk over the long run, investors may want to think about choosing shorter-term stocks or shorter-life alternative equities.

Stock returns responded negatively to short-term interest rates. This corroborates the results of Olasehinde-Williams *et al.* (2024) who found that interest rate volatility also had a negative effect on Nigeria's market economy. These results, however, run counter to those of Ahiadorme *et al.* (2019), who argue that interest rate variation has a positive and significant impact on stock market returns. The relative strength of banking stocks on the Ghana Stock Exchange is cited as the reason for this positive influence. According to Souza *et al.* (2024), interest rate volatility had the least effect on the returns of banks listed on the Brazilian Stock Exchange. Interest rates had a negative impact on B3's performance in the Brazilian stock market, according to Vieira & Ferrando (2024). Melo & Gomes (2023) discovered compelling evidence of the impact of monetary policy on the Brazilian stock market, both through the interest rate channel and unexpected shift in the monetary aggregate levels. In particular, stock returns were significantly boosted by liquidity levels rather than by a decline in interest rates. The findings validated those previously made by Mahpudin & Batu (2021) for the Brazilian Stock Market Index.

After the pandemic, we mainly saw that the absolute returns effect of short-term interest rate volatility was closer to unity. The volatile link between interest rates and equities returns was highlighted. The substantial influence that interest rate variations have on market behaviour has been brought to light by developments since the Covid-19 pandemic. Rising rates usually put downward pressure on stock prices, which in turn causes a drop in stock return. These variables frequently fluctuate in contrasting directions leading to a decline in the value of stock returns. According to the ARDL estimations, this finding is consistent with those of Komba et al. (2024), who noted that interest rate volatility had an inverse impact on stock returns and that exchange rate also inversely but more significantly impacted stock return in Tanzania. The findings are substantiated by Katembo's (2024), who shows that rising interest rates reduce economic expansion and business profits while increasing market volatility, which forces investors to reevaluate Congolese equities.

Further sensitivity analysis of the impact of control variable, namely short-term interest rate variation, on stock returns indicates that the observed impact was larger after the pandemic struck the market. This underscores the significance of all the conditional effects of short-term interest rate volatility and liquidity turnover that followed the Covid-19 event. The observed conditional effects of oil price volatility on returns were significant only at 3 quantiles before and after the outbreak of pandemic. The research shows that after the pandemic started, the influence of short-term interest rate volatility on returns was closer to unity. As regards the conditional effects of short-term interest rate volatility and liquidity turnover after covid-19, further sensitivity analysis reveals that the observed impact of short-term volatility on the interest rate was larger after the pandemic hit the market compared to its impact before the pandemic. Stock returns were negatively linked with short-term interest rate volatility but positively linked with liquidity turnover before the outbreak of the pandemic at the 10^{th}, 20^{th}, 30^{th}, and 40^{th} quantile. Besides, the observed conditional effects of oil price volatility on returns were significant only at the 3 quantiles before and after the outbreak of pandemic. The quantile effects of oil price volatility on returns were greater after the covid-19 outbreak. The results uphold that oil prices have a direct impact on the stock returns and this causes significant swings in the stock returns of energy businesses. Stock market investors may view a rise in oil prices as a threat to the global economy and corporate profit margins, which could affect investor sentiment. Consequently, the stock market may become more volatile as a result of increased selling pressure and uncertainty.

Sreenu (2023) likewise demonstrated that exchange rate fluctuations had a detrimental impact on short-term stock market returns, focusing analysis on ECM, GARCH and ARDL model results. Vieira & Ferrando (2024) also noted that the real exchange rate variation had a detrimental impact on the Ibovespa index's performance. As banks offer greater return and reduced risk, investors shift their funds from financial markets to banks. As a larger discount rate is applied to future cash flow, higher interest rates also translate into lower future discounted valuations. Financial investors should take note of the study's consequences.

Stock returns responded favourably to the liquidity turnover that was maintained throughout the pandemic. While the conditional effect of liquidity turnover was smaller before the Covid-19 era than it was after, the conditional effects of interest rate volatility were also found to be higher than those that existed before to the Covid-19 pandemic. Specifically, the estimates of liquidity turnover before the incidence of Covid-19 were positive; they appear to corroborate the findings of Aregbesola *et al.* (2024), Kumshe *et al.* (2024), Zhang & Han (2022), Nguyen *et al.* (2020). Aregbesola *et al.* (2024) reported that liquidity risk had a favourable and noteworthy effect on return on equity, indicating that profitability is increased through efficient management of liquidity risk. Kumshe *et al.* (2024) discovered through a panel regression study that the credit risk management of Nigerian banks, returns on equity, returns on assets, and returns on capital employed are all positively and significantly moderated by liquidity management. Zhang & Han (2022) found that volatility shocks and illiquidity shocks have a feedback connection. Nguyen *et al.* (2020) used the sys-GMM on a panel of 34 emerging countries and discovered that stock market returns in these countries are positively impacted by excess liquidity, proportionally to the level of economic development of the country.

Our results that concern harmful effects of the volatility in the currency exchange rates on stock market returns do not agree with those of (Bhargava & Konku, 2023; Dewanti et al., 2022; Bouazizi et al., 2022; Guler, 2020; Mishra, 2019). Bhargava & Konku (2023) estimated the VAR/VECM and GARCH models and reported that currency volatility had positive effect on market returns in the USA. Dewanti, Rusmita., & Samad (2022) using the EGARCH method on a daily time series found that exchange rate volatility had positive effect on Chinese, and Korean stock markets' returns. Bouazizi *et al*. (2022) saw positive impact of foreign exchange volatility on stock markets of Germany, Japan and the United States. Guler (2020) estimated the Bivariate Asymmetric Quadratic GARCH model with daily data for the period between July 2005 and April 2020 to discover a positive impact of the exchange rate volatility on the return volatility in Turkey. Mishra (2019) estimated the GARCH-DCC with daily trading data of ten years for the Japanese and Indian forex markets and found significant and positive effects of forex volatility on stock market returns. While we appreciate the fact that foreign exchange rate volatility positively impacted stock market returns of the aforementioned countries, it is also reasonable to cautiously observe that the majority of the countries involved are the developed ones with well-functioning equity markets.

Unlike the stock returns effects of liquidity before the outbreak of Covid-19, the stock returns effects of liquidity after the pandemic had begun were all negative. These findings support those by Olofin *et al.* (2024), Sethy & Tripathy (2024), Cheng, Liu, Jiang, & Cao (2023). Olofin *et al.* (2024) observed an adverse effect of liquidity risk on the profitability of Nigerian deposit money institutions. Sethy & Tripathy (2024) discovered that illiquidity shocks had an uneven impact on conditional volatility in the Indian stock market. Cheng, Liu, Jiang, & Cao (2023) showed that stock liquidity had a negative relationship with accrual anomaly.

6. Conclusion

This paper explores the impact of stock market volatility and liquidity turnover on emerging market returns in countries of the MENA region. Today, it is crucial to empirically examine the interaction of joint variables and their moderating effects, so the paper evaluates interactive regression policy analysis. The interacted variable of international economic policy uncertainty and exchange rate fluctuation is to be taken into account by policy measures aimed at enhancing the stock markets' resilience. The research findings show that uncertainty in macroeconomic policy together with variations in exchange rates can significantly dampen stock returns. The paper presents empirical research into the behavior of stock markets under exchange rate fluctuations and extreme uncertainty in international economic policy. The estimated panel quantile regression indicates high levels of significant quantile effects of the factors influencing stock market returns before the Covid-19 pandemic.

The key findings of the study include, first, high level of quantile interacted effect of international economic policy uncertainty and currency exchange rate volatility on stock returns and, second, low levels of quantile effects of liquidity turnover on stock returns before the outbreak of Covid-19 pandemic. Ample empirical evidence points to the shifting dynamics in the impact of market volatility on returns as we move from before the outbreak of pandemic to the post-pandemic era. It is therefore advisable that the central monetary authorities and governments of the MENA countries engage in a joint effort to uphold stability in the stock market by implementing policies to strengthen the resilience of the stock exchanges and the overall equity market against the adverse consequences of foreign economic policy-induced uncertainty in the midst of rising volatility in the exchange rate. The time-based and historical scopes of the stock markets of the countries covered by this research were limited by data availability constraints. Moreover, the fresh insights regarding the interactive effects of international economic policy uncertainty and the fluctuations in exchange rates on stock market performance made no provision for structural breaks. Further research should look into the possibility of analyzing interactive effects of the two variables in the presence of multiple breaks regimes. This would envolve conducting the panel multiple structural break tests. It may be fruitful to engage the wavelet approach to determine whether or not stock returns are driven by the interactive movements in exchange rates and policy uncertainty within the short-term, medium-term, or long-term frequencies with control for pandemic-related occurrences.

References

Aawaar, G., Logogye, L., & Domeher, D. (2023). Equity return volatility in Africa's stock markets: A dynamic panel approach. *Cogent Economics & Finance, 11*(2), 2258704. https://doi.org/10.1080/23322039.2023.2258704

Adam, N., Sidek, N. Z. M., & Sharif, A. (2022). The impact of global economic policy uncertainty and volatility on stock markets: Evidence from Islamic countries. *Asian Economic and Financial Review*, *12*(1), 15-28. https://doi.org/10.18488/5002.v12i1.4400

Agoba, A. M., Abor, J. Y., Osei, K. A., & Sa-Aadu, J. (2020). The independence of central banks, political institutional quality and financial sector development in Africa. *Journal of Emerging Market Finance*, 19(2), 154-188. https://doi.org/10.1177/0972652719877474

Ahiadorme, J. W., Sonyo, E., & Ahiase, G. (2019). Time series analysis of interest rates volatility and stock returns in Ghana. *Emerging Economy Studies*, *5*(2), 89-102.https://doi.org/10.1177/2394901519870765.

Ahir, H., Bloom, N., & Furceri, D. (60). Years of uncertainty. *Finance & Development*, *57*(1), 58-60.

Ahir, H., Bloom, N., & Furceri, D. (2022). *The world uncertainty index* (No. w29763). National bureau of economic research.

Aregbesola, O. D., Wright, O., Kolawole, I. T., Omojola, S. O. (2024). Impact of liquidity risk and leverage on the financial performance of Nigerian deposit money banks. *JEFMS Journal, 7*(8), 4867-4876. https://doi.org/10.47191/jefms/v7-i8-10

Asafo-Adjei, E., Agyapong, D., Agyei, S. K., Frimpong, S., Djimatey, R., & Adam, A. M. (2020). Economic policy uncertainty and stock returns of Africa: a wavelet coherence analysis. *Discrete Dynamics in Nature and Society*, *2020*(1), 8846507. https://doi.org/10.1155/2020/8846507

Asongu, S. A., (2020a). Technology, Education, Life and Non-life Insurance in Africa. *International Journal of Public Administration*, *43*(11), 915-925. https://doi.org/10.1080/01900692.2019.1660994

Asongu, S. A., (2020b). Financial access and productivity dynamics in sub-Saharan Africa. *International Journal of Public Administration, 43*(12), 1029-1041. https://doi.org/10.1080/01900692.2019.1664570

Awotunde, A., Asamu, A., Ogbebor, P. I., & Wale-awe, I. (2024). Exchange rate volatility and stock market capitalization in Nigeria. *Seybold Report Journal, 19*(03), 250-269. https://doi.org/10.5110/77.1132

Barak, D., & Ünlü, M. (2024). Economic policy uncertainty and remittance nexus: evidence from top 10 remittance-receiving countries. *Politická ekonomie, 72*(4), 653-675, https://doi.org/10.18267/j.polek.1430

Bhargava, V., & Konku, D. (2023). Impact of exchange rate fluctuations on US stock market returns. *Managerial finance*, *49*(10), 1535-1557. https://doi.org/10.1108/mf-08-2022-0387

Brambor, T., Clark, W. M., & Golder, M., (2006). Understanding interaction models: improving empirical analyses. *Political Analysis, 14*(1), 63-82.

Bouazizi, T., Mrad, F., Hamida, A., & Nafti, S. (2022). Effects of conditional oil volatility on exchange rate and stock markets returns. *International Journal of Energy Economics and Policy*, *12*(2), 53-71. https://doi.org/10.32479/ijeep.12826

Cheng, S., Liu, W., Jiang, Q., & Cao, Y. (2023). Multi-scale risk connectedness between economic policy uncertainty of China and global oil prices in time-frequency domains. *Comput Econ, 61*(4), 1593-1616. https://doi.org/10.1007/s10614-022-10254-6

Chiang, T. C. (2021). Geopolitical risk, economic policy uncertainty and asset returns in Chinese financial markets. *China Finance Review International, 11*(4), 474–501. https://doi.org/10.1108/CFRI-08-2020-0115

Dash, S. R., Maitra, D., Debata, B., et al. (2021). Economic policy uncertainty and stock market liquidity: Evidence from G7 countries. *International Review of Finance, 21*(2), 611-626. https://doi.org/10.1111/irfi.12277

Davis, S. J. (2016). *An index of global economic policy uncertainty* (No. w22740). National Bureau of Economic Research..

Desalegn, T. A., & Zhu, H. (2021). Does economic policy uncertainty affect bank earnings opacity? Evidence from China. *Journal of Policy Modeling, 43*(5), 1000-1015. https://doi.org/10.1016/j.jpolmod.2021.03.006.

Dewanti, L. A., Rusmita, S. A., & Samad, K. (2022). Sensitivity Islamic stock return in Asia: the effect of exchange rate volatility. *Journal of Islamic Economics and Business, 8*(2), 302-317. https://doi.org/10.20473/jebis.v8i2.39018

Durmaz, N. (2024). The effects of policy uncertainty on stock prices: revisiting with selected countries. *Ekonomika, 103*(3), 57- 69. DOI: https://doi.org/10.15388/Ekon.2024.103.3.4

Gu, J. & Volgushev, S. (2019). Panel data quantile regression with grouped fixed effects. *Journal of Econometrics, 213*(1), 68-91. https://doi.org/10.1016/j.jeconom.2019.04.006

Guler, D. (2020). The impact of the exchange rate volatility on the stock return volatility in Turkey. *Eurasian Journal of Business and Management*, 8(2), 106-123.

Gyamerah, S. A., Agbi-Kaiser, H. O., Asare, C., & Dzupire, N. (2024). Asymmetric impact of heterogenous uncertainties on the green bond market. *Discrete Dynamics in Nature and Society, 2024*(1), 6644658. https://doi.org/10.1155/2024/6644658

He, X., Gokmenoglu, K. K., Kirikkaleli, D., & Rizvi, S. K. A. (2023). Co-movement of foreign exchange rate returns in an emerging market: Evidence from the wavelet coherence approach. *International Journal of Finance & Economics, 28*(2), 1994-2005. https://doi.org/10.1002/ijfe.2522

Herley, M. D., Orlowski, L. T., & Ritter, M. A. (2023). Asymmetric responses of equity returns to changes in exchange rates at different market volatility levels, *The Journal of Economic Asymmetries, (28)*, e00336. https://doi.org/10.1016/j.jeca.2023.e00336.

Hung, N. T. (2022). Spillover effects between stock prices and exchange rates for the central and eastern European countries. *Global Business Review,* 23(2), 259-286. https://doi.org/10.1177/0972150919869772

Istiak, K., Alam, M. R. (2020). US economic policy uncertainty spillover on the stock markets of the GCC countries. *Journal of Economic Studies, 47*(1), 36-50. https://doi.org/ 10.1108/JES-11-2018-0388

Kannadhasan, M., & Das, D. (2020). Do Asian emerging stock markets react to international economic policy uncertainty and geopolitical risk alike? A quantile regression approach. *Finance Research Letters, (34)*, 101276. https://doi.org/10.1016/j.frl.2019.08.024

Karaömer, Y., & Guzel, A. E. (2024). Effect of economic policy uncertainty on stock returns: analyzing the moderating role of government size. *Politická ekonomie, 72*(1), 50-72, https://doi.org/10.18267/j.polek.1407

Katembo, A. (2024). Effect of interest rate changes on stock market volatility in Congo. *American Journal of Finance*, *10*(3), 1–12. https://doi.org/10.47672/ajf.2168.

Kato, K., Galvao, A. F., & Montes-Rojas, G. (2012). Asymptotics for panel quantile regression models with individual effects. *Journal of Econometrics, (170)*, 76-91. https://doi.org/10.1016/j.jeconom.2012.02.007

Keshtgar, N., Pahlavani, M., & Mirjalili, S. H. (2020). The impact of exchange rate volatility on banking performance (case of Iran). *International Journal of Business and Development Studies, 12*(1), 39-56. https://doi.org/10.22111/ijbds.2020.5436.

Koenker, R. (2004). Quantile regression for longitudinal data. *Journal of Multivariate Analysis, (91)*, 74-89. https://doi.org/10.1016/j.jmva.2004.05.006

Koenker, R. (2017). Quantile regression: 40 years on. *Annual Review of Economics, 9*(1), 155-176. https://doi.org/10.1146/annurev-economics-063016-103651

Komba, C., Sobe, P., & Mwakujonga, J. (2024). Effects of interest and exchange rate volatility on stock returns: Evidence from the financial sector of Tanzania. *NG Journal of Social Development, 13*(1), 215-225. https://dx.doi.org/10.4314/ngjsd.v13i1.16

Kumshe, H., Abba, M., Umar, B., & Modibbo, S. (2024). Effect of liquidity and profitability on credit risk management of listed deposit money banks in Nigeria. *Journal of Economics, Finance and Management Studies*, (*7), 3900- 3907.* https://doi.org/10.47191/jefms/v7-i7-08

Kundu, S., Paul, A. (2022). Effect of economic policy uncertainty on stock market return and volatility under heterogeneous market characteristics. *International Review of Economics & Finance, (80)*, 597-612. https://doi.org/10.1016/j.iref.2022.02.047

Lamarche, C. (2021). Quantile regression for panel data and factor models. *Oxford Research Encyclopedia of Economics and Finance*. https://doi.org/10.1093/acrefore/9780190625979.013.669

Li, R., Li, S., Yuan, D., et al. (2020). Does economic policy uncertainty in the U. S. influence stock markets in China and India? Time-frequency evidence. *Applied Economics, 52*(39), 4300-4316. https://doi.org/10.1080/00036846.2020.1734182

Ma, Y., Wang, Z., He, F. (2022). How do economic policy uncertainties affect stock market volatility? Evidence from G7 countries. *International Journal of Finance & Economics, 27*(2), 2303-2325. https://doi.org/10.1002/ijfe.2274

Mahpudin, E., & Batu, R. L. (2021, September). The impact of macroeconomics on stock market index in Brazil. In *5th Global Conference on Business, Management and Entrepreneurship (GCBME 2020)* (77-81). https://doi.org/10.2991/aebmr.k.210831.017

Mashilal, M., Amalia, F., Visita, L. (2024). Global economic policy uncertainty and Islamic stock market in Indonesia. *Muqtasid: Jurnal Ekonomi Dan Perbankan Syariah*, (14), 115–132. https://doi.org/10.18326/muqtasid.v14i2.115-132

Melo, M. M., & Gomes, J. W. F. (2023). The impact of monetary policy on the Brazilian stock market. *Archives of Business Research, 11*(4), 52-65. https://doi.org/10.14738/abr.114.14360.

Mishra, A. (2019). Crude oil, stock market, and foreign exchange return volatility and spillover: A GARCH DCC analysis of Indian and Japanese financial market. *International Journal of Business Innovation and Research, 20*(1), 25-46. https://doi.org/10.1504/IJBIR.2019.101687

Moudud-Ul-Huq, S., & Akter, R. (2024). Impacts of economic policy uncertainty (EPU) and institutional quality (IQ) on bank risk-taking behavior. *Kybernetes*, 53(3), 1148-1167. https://doi.org/10.1108/K-07-2022-1004

Msomi, S., & Kunjal, D. (2024). Industry-specific effects of economic policy uncertainty on stock market volatility: A GARCH-MIDAS approach. *Quantitative Finance and Economics, (8).* 532-545. https://doi.org/10.3934/QFE.2024020

Muhammadriyaj, F., & Shamsher, S. (2024). Economic policy uncertainty and stock market performance: evidence from the Middle East. *International Journal of Diplomacy and Economy, 10*(1), 5-38. https://doi.org/10.1504/IJDIPE.2024.137092

Nguyen, C. P., Schinckus, C., Su, T. D., & Chong, F. H. (2022). Determinants of stock market returns in emerging markets: The linkage between institutional quality and macro liquidity. *International Journal of Finance & Economics*, *27*(4), 4472-4486. https://doi.org/10.1002/ijfe.2382

Odionye, J. C., Ojiaku, E. U., Okpara, G. C., Agoh, N., & Okpara, R. M. (2024). Economic policy uncertainty and stock market index: fresh insights from augmented-ARDL and multiple structural breaks. *Journal of International Commerce, Economics and Policy (JICEP)*, 15(02), 1-24, https://doi.org/10.1142/S1793993324500108

Olasehinde-Williams, G., Omotosho, R., & Bekun, F. V. (2024). Interest rate volatility and economic growth in Nigeria: New insight from the quantile autoregressive distributed lag (QARDL) model. *Journal of the Knowledge Economy*, 1-24. https://doi.org/10.1007/s13132-024-01924-x

Olofin, A., Muritala, T., Maitala, F., Abubakar, H., & Ajalie, S. (2024). The impact of liquidity risk on profitability of listed deposit money banks in Nigeria. *International Journal of Professional Business Review, (9),* e4777. https://doi.org/10.26668/businessreview/2024.v9i6.4777

Qiao, T., Ding, W., Han, L., & Li, D. (2024). RMB exchange rate volatility and the cross-section of Chinese A-share returns, *Journal of International Money and Finance, (142)*, 103024, https://doi.org/10.1016/j.jimonfin.2024.103024.

Sethy, T. K., & Tripathy, N. (2024). A new method for estimating liquidity and stock returns in Indian stock market. *China Accounting and Finance Review, 26*(2), 253-275. https://doi.org/10.1108/CAFR-05-2023-0052

Souza, P. H. Â., Tessmann, M. S., & Rossi, J. L. (2024). The Impacts of the Interest Rate, the Exchange Rate, and the Market Index on the Stock Returns of the Brazilian Banks. Journal of Applied Finance & Banking, 14(2), 45-60. https://doi.org/10.47260/jafb/1423

Spulbar, C., Birau, F. R., Trivedi, J., Hawaldar, I. T., & Minea, E. L. (2022). Testing volatility spillovers using GARCH models in the Japanese stock market during COVID-19. *Investment Management and Financial Innovations*, *19*(1), 262-273. https://doi.org/10.21511/imfi.19(1).2022.20

Sreenu, N. (2023). Effect of Exchange Rate volatility and inflation on stock market returns Dynamics-evidence from India. *International Journal of System Assurance Engineering and Management*, *14*(3), 836-843. https://doi.org/10.1007/s13198-023-01914-3

Sreenu, N., Rao, K. S., & Naik, S. (2022). Impact of exchange rate and inflation rate on stock market return volatility in India. *Academy of Marketing Studies Journal, 26*, 1-11.

Su, Z., Fang, T., & Yin, L. (2019). Understanding stock market volatility: What is the role of U. S. uncertainty? *The North American Journal of Economics & Finance*, *(48)*, 582-590. https://doi.org/10.1016/j.najef.2018.07.014

Tian, M., El Khoury, R., & Alshater, M. M. (2023). The nonlinear and negative tail dependence and risk spillovers between foreign exchange and stock markets in emerging economies. *Journal of International Financial Markets, Institutions and Money, (*82), 101712. https://doi.org/10.1016/j.intfin.2022.101712

Tchamyou, V. S. (2019). The role of information sharing in modulating the effect of financial access on inequality. *Journal of African Business, 20*(3), 317-338. https://doi.org/10.1080/15228916.2019.1584262

Tchamyou, V. S., & Asongu, S. A., (2017). Information sharing and financial sector development in Africa. *Journal of African Business, 18*(7), 24-49. https://doi.org/10.1080/15228916.2016.1216233

Uddin, M., Chowdhury, A., Anderson, K., & Chaudhuri, K. (2021). The effect of Covid-19 pandemic on global stock market volatility: Can economic strength help to manage the uncertainty? *Journal of Business Research*, (*128),* 31-44. https://doi.org/10.1016/j.jbusres.2021.01.061

Umar-Farouk, A., Alagidede, I., & Tweneboah, G. (2024). On the connectedness of stock returns and exchange rates in emerging and frontier markets in Africa. *Review of Banking, Finance and Monetary Economics, 53(3), e12249.* https://doi.org/10.1111/ecno.12249

Vieira, E. & Ferrando, G. (2024). Macroeconomic determinants of the Brazilian stock market: an autoregressive distributed lag approach. *Open Journal of Business and Management*, (*12),* 4055-4072. https://doi.org/10.4236/ojbm.2024.126203

Wuyi, Y. E., Wang, K., & Liu, X. (2023). Liquidity, volatility, and their spillover in stock market. *Available at SSRN 4495111*.

Xu, Y., Wang, J., Chen, Z., *et al*. (2021). Economic policy uncertainty and stock market returns: New evidence. *North American Journal of Economics and Finance, (58),* 101525. https://doi.org/10.1016/j.najef.2021.101525

Yanxi, H., Leng, X., Peng, L., & Zhou, Y. (2024). Panel quantile regression for extreme risk. *Journal of Econometrics, 240*(1), 105674. https://doi.org/10.1016/j.jeconom.2024.105674.

Yuan, D., Li, S., Li, R., & Zhang, F. (2022). Economic policy uncertainty, oil and stock markets in BRIC: Evidence from quantiles analysis. *Energy Economics*, (*110)*, 105972. https://doi.org/10.1016/j.eneco.2022.105972

Zeng, Q., Tang, Y., Yang, H., & Zhang, X. (2024). Stock market volatility and economic policy uncertainty: New insight into a dynamic threshold mixed-frequency model. *Finance Research Letters*, (*59)*, 104714. https://doi.org/10.1016/j.frl.2023.104714

Zhang, J., & Han, W. (2022). Carbon emission trading and equity markets in China: How liquidity is impacting carbon returns? *Economic Research-Ekonomska Istraživanja, 35*(1), 6466–6478. https://doi.org/10.1080/1331677x.2022.2049010